codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

JOINT OFFICE: Via delle Terme di Caracalla 00100 ROME: Tel. 57971 Telex: 610181 FAO I. Cables Foodagri

ALINORM 87/18
PART II

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APPENDICES III TO XV

(pp. 62 - 179)

W/Z 1265

PROPOSED DRAFT STANDARD FOR QUICK FROZEN BLOCKS OF FISH FILLET, MINCED FISH FLESH AND MIXTURES OF FILLETS AND MINCED FISH FLESH

(at Step 5)

1. SCOPE

This Standard shall apply to quick frozen blocks of cohering fish flesh, prepared from fillets or minced fish flesh or a mixture of fillets and minced fish flesh which are intended for further processing.

2 DESCRIPTION

2.1 Product Definition

(a) Quick frozen blocks are rectangular or other uniformly shaped masses of cohering fish fillets, pieces of such fillets, minced fish or a mixture thereof comprising:

(i) a single species; or
(ii) a mixture of species.

(b) Fillets are slices of fish of irregular size and shape which are removed from the carcass by cuts made parallel to the back bone and pieces of such fillets.

(c) Minced fish flesh used in the manufacture of blocks are particles of skeletal muscle which have been separated from and are essentially free from bones and skin.

2.2 Process Definition

The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete until the product temperature has reached a level which will ensure that the temperature at the thermal centre will not be higher than -18 C after thermal stabilisation. The product shall be maintained under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. The recognized practice of further processing of intermediate quick frozen material under controlled conditions followed by the reapplication of the quick freezing process is permitted.

2.3 Presentation

(a) Fillets:

(i) skin on, unscaled, pin bone removed
(ii) skin on, scaled, pin bones present or removed
(iii) skinless, pin bones present or removed.

(b) Fillets skinless, pin bones removed and minced fish flesh.

(c) Minced fish flesh.

(d) Other presentations: Any other presentation of the product shall be permitted provided that it:

(i) is sufficiently distinctive from other forms of presentation laid down in this Standard;

(ii) meets all other requirements of this Standard; and

(iii) is adequately described on the label to avoid confusing or misleading the consumer.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw Material

Quick frozen blocks shall be prepared from well drained fillets or minced flesh of sound fish which are of a quality fit to be sold fresh for human consumption.

3.2 Optional Ingredients

Food grade salt may be added provided that the total sodium chloride content does not exceed 1,0% by weight.

3.3 Final product

3.3.1 Blocks shall contain no more defects than are permitted in Annex B.

3.3.2 Cooking, steaming, baking or boiling to determine any defects should be undertaken as set out in Annex A.

4. FOOD ADDITIVES	Maximum level in the final product
4.1 Phosphates and Alginates	
4.1.1 Monophosphate, monosodium or monopotassium (Na or K pyrophosphate)	5 g/kg expressed as P_2O_5, singly or combination.
4.1.2 Diphosphate, tetrasodium or tetrapotassium (Na or K pyrophosphate)	
4.1.3 Triphosphate, pentasodium or pentapotassium or calcium (Na, K or Ca tripolyphosphate)	
4.1.4 Polyphosphate, sodium (Na hexametaphosphate)	
4.1.5 Sodium alginate	5 g/kg
4.2 Antioxidants	
4.2.1 Ascorbic acid or its sodium or potassium salt	1g/kg, expressed as ascorbic acid singly or in combination
4.2.2 Ascorbyl palmitate	

In addition, for Minced Fish Flesh only:

4.2.3	Citric acid and Na or K salts	)	1 g/kg
4.3	Thickening Agents		
4.3.1	Guar gum	)	
4.3.2	Carob bean (locust bean) gum	)	5 g/kg singly
4.3.3	Pectins	)	or in combination
4.3.4	Carboxymethyl cellulose, sodium salt	)	
4.3.5	Xanthan gum	)	
4.3.6	Carrageenan	)	
4.3.7	Methyl Cellulose	)	

5. HYGIENE AND HANDLING

5.1 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.2 When tested by appropriate methods of sampling and examination, the product:

(a) shall be free from micro-organisms in amounts which may represent a hazard to health;

(b) shall be free from parasites which may represent a hazard to health; and

(c) shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.

5.3 It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969 Rev. 1979) and the Recommended Code of Practice for Frozen Fish (CAC/RCP 16-1978)

6. LABELLING

The information required in 6.1-6.6 may be supplied by the name of the food and code identification and given only in related documents provided that such a code is clearly identifiable with the related documents. 1/

6.1 Name of the Food

6.1.1 The name of the food shall be declared as "x y blocks" in accordance with the law custom or practice of the country in which the product is distibuted, "y" shall represent the common name of the species or species packed and "x" shall represent the form of presentation of the block (see Section 2.3).

6.1.2 Blocks prepared from fillets may be designated in accordance with the presentations set forth in Section 2.3(a)(i)-(iii) as applicable.

1/ The text to be revised in accordance with paras. 97-99.

6.1.3 In addition, the labelling shall show the term "frozen", or "quick frozen" whichever is customarily used in the country in which the product is distributed, to describe a product subjected to the freezing process described in Sub-Section 2.2.

6.1.4 The proportion of mince in percentage of net fish content shall be declared by stating the percentage ranges: less than 25, 25-35, etc. Blocks with more than 90% mince are regarded as mince blocks.

6.2 List of Ingredients

6.2.1 A complete list of ingredients shall be declared in descending order of proportion.

6.3 Net Contents

6.3.1 The net content shall be declared by weight in metric system ("Systeme international" units) or avoirdupois or both systems as required by the country in which the food is distributed.

6.3.2 Where products have been glazed the declaration of the net contents of the product shall be exclusive of the glaze.

6.4 Name and Address

The name and addres of the manufacturer, packer, distributer, importer, exporter or vendor of the food shall be declared.

6.5 Country of Origin

6.5.1 The country of origin shall be declared if its omission would mislead or deceive the consumer.

6.5.2 When a food undergoes processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purposes of labelling.

6.6 Lot Identification

Each non-retail container shall be permanently marked in code or in clear to identify the producing factory, the lot and the date of production.

6.7 Storage Instructions

The non-retail container shall bear clear directions for storage.

7. METHODS OF SAMPLING, EXAMINATION AND ANALYSIS

The methods of sampling, examination and analysis described hereunder are international reference methods.

7.1 Sampling Procedure for Fish Blocks

7.2 Organoleptic Examination

Samples taken for organoleptic and physical examination shall be assessed by persons trained in such examination.

7.3 Quantities for Physical and Organoleptic Examination

The detection of net weight and weight exclusive of glaze shall be determined on a whole block in the frozen state.

7.4 Determination of Net content of Products covered by Glaze

(Method to be developed).

7.5 Determination of Proportions of Fillet and Minced Fish in Quick Frozen Blocks prepared from Mixtures of Fillets and Minced Fish

7.6 Candling Procedure for the Detection of Parasites 1/

7.7 Determination of Sodium Chloride

According to the Codex General Method for the Determination of Chlorides in Foods. (ALINORM 76/23, Appendix IV).

8. CLASSIFICATION OF DEFECTIVES

A block which exceeds the tolerances for defects provided in Annex B shall be considered "defective".

9. LOT ACCEPTANCE

(i) Quality

A lot will be considered as meeting the Final Product requirements of this Standard when the total number of "defective sample units" in a sample does not exceed the acceptance number specified in the sampling plans specified in Section 7.1.

(ii) Net contents

A lot will be considered as meeting the weight requirement when the average net content of all containers examined is not less than the declared weight provided there is no unreasonable shortage in individual containers.

ANNEX 'A'

COOKING METHODS

Following procedures are based on heating product to internal temperature $\geqslant$ 70 C (160 F). Cooking times vary according to size of product and equipment used. If determining cooking time, cook extra sample using temperature measuring device to determine internal temperature. An extra sample of 200.0 grammes is used.

1/ See Appendix IV, Section 7.5.

(a) Baking Procedure: Wrap product in aluminium foil and distribute evenly on flat cookie sheet or shallow flat pan. Heat in ventilated oven, preheated to 204 C (400 F), until internal temperature of product reaches ⩾ 70 C (160 F).

(b) Steaming Procedure: Wrap product in aluminium foil and place on wire rack suspended over boiling water in covered container. Heat until internal temperature of product reaches ⩾ 70 C (160 F).

(c) Boiling in Bag: Place the product into a boilable film-type pouch and seal. Immerse the pouch and its contents into boiling water and cook until the internal temperature of the product reaches ⩾ 70 C (160 F).

ANNEX 'B'

DEFECTS TABLE FOR QUICK FROZEN BLOCKS OF FISH FILLETS AND BLOCKS OF MIXTURES OF FILLETS AND MINCED FISH FLESH

Note: The total number of demerit points is to be calculated on a 1 kg basis and recorded to the nearest whole number, except where the points are derived from examination of the frozen block. Such points shall be added to the total derived from examination of the thawed and cooked state calculated to a 1 kg basis.

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
A. FROZEN STATE		
1. Block Irregularity (applies only to blocks intended for cutting)		
Deviations from declared dimensions (e.g. length, width and thickness of a block), non-uniformity of shape, poor angles, ragged edges, ice pockets, air pockets or other damage which would result in product loss.	a) Deviation from declared (nominal) dimensions:	
	Length, width and thickness.	
	(i) Over 5 mm in any dimension	8
	(ii) Over 3 mm and up to and including 5 mm in any dimension	4
	Edges (formed by two surfaces)	
	(i) A gap greater than 10 mm between the actual and true edge	4
	(ii) A gap greater than 5 mm and up to and including 10 mm between the actual and true edge	2
	Angles (formed by three surfaces)	
	(i) A gap greater than 10 mm between the actual and true corner measured at the apex of the corner.	4
	(ii) A gap greater than 5 mm and up to and including 10 mm between the actual and true corner measured at the apex of the corner	2

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
	b) Ice Pockets (i) Each pocket with a surface area greater than 10 cm^2 and up to and including 20 cm^2.	4
	(ii) Each additional complete area of 10 cm^2 or part thereof	2
	c) Air Pockets (including troughs)	
	(i) Each pocket with a surface area greater than 2 cm^2 up to and including 5 cm^2 and with a depth greater than 3 mm	4
	(ii) Each additional complete area of 5 cm^2 or part thereof or if the depth is greater than 10 mm	2
2. Dehydration (freezerburn) (i) Deep dehydration - An excessive loss of moisture from the surface of the sample unit which shows clearly on the surface, penetrates below the surface, and cannot be easily removed by scraping.	Over 10% of total surface area or (a) $\leq$ 200g units $\geq$ 25 cm^2 (b) 201-500g units $\geq$ 50 cm^2 (c) 501-5000g units $\geq$ 150 cm^2 (d) 5001-8000g units $\geq$ 300 cm^2 (e) > 8000g units $\geq$ 500 cm^2	Defective
	Over 1% up to and including 10% of total surface area or (a) $\leq$ 200g units 2.5-25 cm^2 (b) 201-500g units 5.0-50 cm^2 (c) 501-5000g units 15.0-150 cm^2 (d) 5001-8000g units 30.0-300 cm^2 (e) > 8000g units $\geq$ 500 cm^2	4
(ii) Moderate dehydration A loss of moisture from the surface of the sample unit which is colour masking, but does not penetrate the surface and can be easily removed by scraping.	Over 10% of total surface area or (a) $\leq$ 200g units $\geq$ 25 cm^2 (b) 201-500g units $\geq$ 50 cm^2 (c) 501-5000g units $\geq$ 150 cm^2 (d) 5001-8000g units $\geq$ 300 cm^2 (e) > 8000g units $\geq$ 500 cm^2	2

	DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
3.	Skin and Black Membrane Skin Does not include sub-cutaneous layer (silver lining). In flat fish white skin is not regarded as a defect.1/	THAWED STATE a) Skinless fillet block (i) Each piece greater than 3 cm^2 up to and including 10 cm^2	4
		(ii) Over 10 cm^2 each additional complete area of 5 cm^2 or part thereof.	2
	Black Membrane or belly lining Does not include white membrane.	b) Skin-on fillet blocks (i) Each instance greater than 3 cm^2 up to and including 10 cm^2	4
		(ii) Over 10 cm^2 each additional area of 5 cm^2 or part thereof.	2
4.	Scales - attached to skin	a) Skin-on fillet blocks - scaled (i) Each area of scale greater than 3 cm^2 up to and including 10 cm^2.	2*
		(ii) Each additional scale complete 5 cm^2 or part thereof.	2*
	- readily noticeable loose scales	b) Skinless fillet blocks (i) First 5 to 10 (in the case of hake fillets 10 to 20).	2
		(ii) If more than 10 (for hake 20) loose scales each additional complete unit of 5 (for hake 10).	2
5.	Colour Defects		
	Blood Clots (Spots) Any mass or lump of clotted blood.	a) Each clot greater than 5 mm in diameter.	2
	Bruises Diffused blood causing distinct reddish, brownish or other off-colouration.	b) (i) Any aggregate area of discolouration or bruising exceeding 3 cm^2 up to and including 5 cm^2.	2
		(ii) Each additional area of 5 cm^2 or part thereof.	2

1/ In Skinless Flat Fish, small pieces of white skin are not regarded as defects, provided that the skin does not exceed more than 10% of the surface area of the fillets in the sample unit.

* For ocean perch fillets only, 1 demerit point.

	DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
	Discolouration Appears as significantly intense discolouration due to melanin deposits, bile stains, liver stains or other causes.		
	Minced part of mixed blocks:	c) Minced part of mixed blocks:	
	Objectionable discolouration, spots or particles derived from skin, black membrane, blood clots, blood spots, spinal cord or viscera.	(i) Distinctly discoloured, spotted or otherwise heavily deviating from the colour of the species.	Defective
		(ii) Objectionable deviation from the colour of the fillet.	2
6.	Fins or part of fins Two or more bones connected by membrane, including internal or external bones, or both, in a cluster.	Any instance where a bone in the fin exceeds 40 mm in length.	Defective
		Each separate instance up to and including 3 cm^2.	4
		Each additional 3 cm^2 or part thereof in the same cluster.	2
7.	Bones Defect Bone A bone is regarded as a defect if its length is $\geq$ 10 mm or its diameter is $\geq$ 1 mm; a bone $\leq$ 5 mm in length is not to be considered as a defect if its diameter is not > 2 mm. The foot of a bone (where it has been attached to the vertebra) shall be disregarded if its width is < 2 mm or if it can be easily stripped off by a finger nail.	a) Blocks containing fillets with pin bone removed.	
		(i) Each defect bone.	2
		(ii) Each critical bone.	Defective
		b) Blocks containing fillets with pin bone in.	
		(i) Each defect bone excluding pin bones.	2
		(ii) Each critical bone excluding pin bones.	8
	Critical degree of bone defect Each defect bone whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40.0 mm and a width of 10.0 mm.		
8.	Viscera Any portion of the internal organs.	Each instance	8

	DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
9.	Parasites Parasites or parasitic infestation detected by the candling procedure or any other non-destructive physical means. Each parasitic infestation may be recognised by its colour, its effect on softening the fish flesh or by other physical indications.	Each parasite with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length.	4
		Each parasite with a capsular diameter smaller than 3 mm or a parasite not encapsulated and smaller than 10 mm in length.	2
		Each fillet affected by any significant parasitic infestation.	8
10.	Foreign Matter (i) Any material not derived from fish or not permitted by the standard other than packaging.	Each instance	Defective
	(ii) Packaging material	Each instance	2
11.	Odour and Flavour Objectionable odour in thawed state.	Any odour which is distinctly objectionable.	Defective
12.	Texture (thawed state)	Any texture which is significantly different to the characteristics of the species.	Defective
C.	COOKED STATE		
13.	Odour and Flavour (Extra sample unit 200 grammes) Objectionable odour or flavour.	Any odour or flavour which after cooking is distinctly objectionable.	Defective
14.	Texture Any texture which is signficantly different to the characteristics of the species.	Distinctly objectionable, e.g. the flesh is definitely spongy, rubbery, mushy, soft, gelatinous, tough or gritty.	Defective

A sample unit is considered defective if the demerit points total more than 20 for species of the families Gadidae (cod, haddock) and Merluccidae (hake) and 32 for species of the family Scorpaenidae (red fish) or the order Pleuronectiformes.

MAXIMUM ALLOWABLE TOLERANCE FOR DEFECTS (BLOCKS)

(Discussion paper by U.K.)

"Maximum tolerable number of demerit points is to be calculated on a 1 KGM basis and recorded to nearest whole number except where points are derived from examination of the frozen block. Total points derived from examination of the frozen block shall be added to the total derived from the examination of the thawed and cooked states calculated on a 1 KGM basis. A sample unit is defective if the total number of demerit points exceeds 20 for species of the families Gadidae Merluccidae (cod, haddock, hake) and 32 for species of the family Scorpaenidae (red fish) or the order pleuronectiformes."

EXAMPLE OF DEFECT NUMBER ASSESSMENT

CHECK TYPE	SAMPLE SIZE	DEFECT TYPE	DEMERIT POINTS IN SAMPLE	PER BLOCK	PER KG
Frozen state	Entire block (8.0 KGMS)	Irregularities	14	14	
		Dehydration	4	4	
		TOTALS	18	18	2
Thawed state	Entire block (8.0 KGMS)	Skin/membrane	4	4	
		Scales	-	-	
		Blood/discoloured	2	2	
		Bones defect	10	10	
		critical	-	-	
		fin	4	4	
		Viscera	-	-	
		Parasites	4	4	
		Foreign matter	-	-	
		Odour	-	-	
		Texture	-	-	
		TOTALS	24	24	3
Cooked state	500 GM	Odour/flavour	-	-	-
		Texture	-	-	-

CALCULATION

Tolerance statement can be interpreted in two ways:

1. Take frozen defects (18) and add to thawed defects (24) to give 42. Divide by 8 to give 5/KGM = ACCEPT.
2. Take thawed/cooked states total points (24), convert to per KGM(3). Add this to total frozen defects (18) to give 21 = DEFECTIVE

Which is correct?

COMMENTS

We believe that calculation method 1 allows too many demerit points in a block (160 in this case for the family Gadidae).

Calculation method 2 implies that defects in the frozen state are treated much more seriously than those found in the thawed state (a factor of eight in this case). This does not appear logical and warrants further discussion.

ANNEX C

DEFECT TABLE FOR QUICK FROZEN BLOCKS OF MINCED FISH FLESH

Defect Description (for defect definitions, see Annex B)	Demerit Points
FROZEN STATE (sample unit = entire block)	
1. Block Irregularity	As per Annex B
2. Dehydration	As per Annex B
THAWED STATE (sample unit = entire block)	
3. Discolouration, blood clots, skin, black and/or white membrane, scale, viscera, spinal cord	
(a) 10-25 instances	2
(b) Over 25 each additional 15 instances or part thereof	2
4. Overall discolouration	
(i) Distinctly discoloured or otherwise heavily deviating from the colour of the species	Defective
(ii) Readily noticeable deviation from the colour of the species	2
5. Bone	
(a) Each defect bone	2
Each critical bone	Defective
[(b) Bone material in amounts exceeding [0.2%] (calculated as calcium)	Defective]
6. The demerit points for parasites, foreign matter and, whether tested in the thawed or cooked state, odour, texture and flavour are as listed in Annex B.	

Maximum Allowable Tolerance for Defects

The total number of demerit points is to be calculated on a 1 kg basis recorded to the nearest whole number.

A block is considered defective if the demerit points per 1 kg as calculated total more than 20.

ANNEX D

DRAFT

Inspection Technique for Quick Frozen Fish Blocks

Acceptance shall be determined by evaluating samples of fish blocks (selected from consignments) in the frozen, thawed, and cooked states; determining the frequency and intensity of defects; calculating a numerical score for each sample unit; and finally, determining lot acceptance based upon the maximum allowable "defectives" per the sampling plan.

Sample Selection

For examination in the frozen and thawed state, a sample unit is one entire fish block. The number of fish blocks comprising the sample selected from a consignment for evaluation shall be in accordance with the sampling plan.

Examination for Defect (frozen)

Each fish block (sample unit) shall be evaluated in the frozen state for those defects specified for examination in the frozen state and demerits assigned as provided by the defect table.

Examination for Defects (thawed)

Each fish block (sample unit) shall be thawed under controlled time and temperature conditions prior to examination. For fillet blocks, each block shall be examined for the specified defects and demerits assigned for each identified defect as provided by the defects table.

For fillet/mince blocks, each thawed block shall be evaluated for fillet/mince ratio using one of the prescribed procedures. Subsequently, the fillets and pieces shall be examined for specified defects for fillets and demerit points assigned for each identified defect.

The minced fish meat separated from each fillet/mince block shall be examined for the specified defects for minced fish meat and demerits assigned for each identified defect. Before examination, the minced fish meat shall be uniformly distributed to a height of approx. 1 cm on a shallow tray (dimensions to be given) to facilitate identification of each defect.

Examination for defects (cooked)

The prescribed amount of fillets pieces and minced fish meat from each block shall be cooked by the prescribed method. The cooked product shall be examined for defects specified for the cooked state and demerits assigned for each identified defect.

Listing Demerit Points and Score

When examination of a sample unit has been completed, determine the number of demerit points assigned to the product in (A) frozen state and (B) thawed and cooked states.
Determine the demerit score for each sample unit by the following formula:

A = sum of demerits in frozen state

$$B = \frac{\text{sum of demerits (thawed and cooked state)}}{\text{No. of kilograms}}$$

Sample unit score = A + B

ANNEX 'E'

PART I

Report by the U.S. on a Method to Determine Percentage of Minced Fish in a Mixed Mince-Fillet Block
Ref: ALINORM 85/18 Appendix III

The National Marine Fisheries Service (NMFS) has completed a collaborative study of a method to determine the percentage of minced fish in a mixed mince-fillet fish block. The design and execution of the study was in accordance with the procedures and protocol of the Association of the Official Analytical Chemists (AOAC). A report on the study has been sent to the AOAC for publication as an Official First Action. A copy of the method is attached.

The principle of the method is as follows:

A mixed mince-fillet fish block is air-thawed, drained, weighed and immersed in a cold water bath. The fillets are separated from the mince by hand and placed on a perforated tray to drain for 15 minutes. The water is poured through a sieve, any fillet pieces are removed from the mince and added to the drain tray. The fillets are drained for 15 minutes and weighed. The amount of minced fish is calculated from the drained weight of the block and the drained weight of the fillets.

Eight collaborators analyzed 6 blind samples of 5-pound cod blocks from each of 3 test lots containing respectively 26.25, 18.75 and 12.5% mince after first examining 2 practice blocks with 20% mince. The Standards Deviations (SD) for the 3 lots (all 8 collaborators combined) were 1.77, 1.51, and 1.65 and the coefficient of variation (CV) were .068, .089, and .162 respectively. The collaborators found the method to be simple, relatively rapid, and requiring only one specialized piece of equipment, i.e., the drain tray. The accuracy is well within the reported degree ($\pm$ 5%) used by those processors preparing mixed blocks.

Five pound blocks were used in this study in lieu of commercial size blocks, because of the expense involved in preparing sufficient samples at 3 levels of mince for all collaborators. However, the common block size used in industry is 16.5 pounds. Therefore, we conducted an informal collaborative study with 10 collaborators who each examined the 16.5 pound fish block samples containing 20.1 percent minced. Although these blocks were over three times the weight of the 5 pound blocks used in the official study, the average SD was only about 1 per cent larger, indicating that the five pound samples were representative of the 16.5 pound commercial fish block.

In order to test the applicability of this method to fish blocks made from species other than cod, we ran an informal study of 5 pound Alaska pollock blocks containing 3 levels of mince using 3 examiners. The results were in the same range as for 5 pound cod blocks. Therefore, the method can be used for Alaska pollock blocks as well as for cod blocks.

During the collaborative study, samples of 5 pound cod blocks containing only fillets were examined using exactly the same procedure. The results of this test showed that during the washing procedure, the fillets absorbed some water indicating a larger error with a higher percentage of fillets. The results of the collaborative study support this since the average error increased with the increased percentage of fillets in the test samples. The U.S. proposes that this method be included in the Draft Standard for Quick Frozen Fish Blocks (ALINORM 85/18, Appendix III under paragraph 7.4).

ATTACHMENT

Physical Separation Method to Determine the Quality of Minced Fish Meat in Mixed Mince-Fillet Fish Blocks

Principle

A mixed mince-fillet fish block is air-thawed, drained, weighed and immersed in a cold water bath. The fillets are separated from the mince by hand and placed on a perforated tray to drain for 15 minutes. The water bath is poured through a sieve,and any fillet pieces are removed from the mince and added to the drain tray. The fillets are drained for 15 minutes and weighed. The amount of minced fish meat is calculated from the drained weight of the block and the drained weight of the fillets.

Apparatus

(a) Shallow tray large enough to hold one fish block for thawing.

(b) Container of sufficient size to hold the fish block plus water.

(c) Perforated tray with 3 to 8 mm holes covering the entire bottom of the tray.

(d) Balance or scale sensitive to 0.25 ounce (7g).

(e) A U.S. No. 8 sieve.

Procedure

The sample is the entire fish block. Thaw the sample on a preweighed tray at ambient (room) temperature (generally this takes overnight). After the block has been completely thawed, it should not be held more than 8 hours before examination. Drain any exuded fluid (thaw-drip) and determine the weight of the drained fish block (weight=A).

Immerse the drained fish flesh in a tub of cold water (50° to 70° F, 10° to 21° C.) Use a ratio of 2 to 3 parts water to 1 part fish by weight. Separate the fillets by hand and wash the minced fish meat from the fillets in the tub. Place the washed fillets on the upper section of the preweighed perforated tray. Incline the tray at an angle of 20° to 40° to facilitate draining.

Pour the water containing the minced fish meat and any small pieces from the tub through the sieve. Remove any fillet pieces from the sieve and place them on the drain tray with the other fillets. Allow the other fillets to drain 15 minutes. Remove any excess water from the lower section of the tray and weigh.

the drained fillets (Weight=B).

Calculation

$$M=\frac{A-B}{A} \times 100$$

Where M= the percentage of minced flesh

A= the weight of the drained, thawed fish block, and

B= the weight of the drained fillets

ANNEX 'E'

PART II

DETERMINATION OF PROPORTIONS OF FILLETS AND MINCED FLESH IN QUICK FROZEN BLOCKS AND PORTIONS (WEFTA METHOD)

The WEFTA Working Group discussed at its Bremerhaven meeting (8-10 April 1986) results of a second collaborative study, which became necessary because of the following reasons:

- Cutting of boneless fillets into ca. 22 mm strips and automatic machines for filling block frames were introduced to improve a.o. the homogeneity of final products (fish sticks)
- USA proposed a modified Norway method for the investigation of whole blocks (see Annex E of ALINORM 85/18, App. III), which had to be tested in respect to its practical suitability
- Based on experiences with the WEFTA method in the SVG-landing control of blocks (Fed. Rep. Germany) the investigation of only 10 selected samples = 2 kg of a 7,6 kg (16 lb) block was found to be representative for the composition of the whole block. This procedure was proposed as quicker, economic and less material and time consuming. The rest of the block can be used for further internal defect investigations.

Material and Results

7 series of total 110 blocks of 7,6 kg from saithe (A-quality) of known fillet/mince proportions were prepared in a Danish factory.
With both tested methods good recoveries of mince additions were obtained, which are nearly identical with the 1984 WEFTA collaborative trial.
Based on the considerations of the presented results and of the demonstrations of the methods the WEFTA-Working Group came to the following

Conclusion and Recommendation:

1. The investigation of a total block, as recommended in the US/N proposal, is not necessary. Although the results are comparable with the WEFTA method, the US/N method is less suitable for practical use: the procedure is more destructive (the fish material cannot be used for other purposes) and needs more care during separation, especially when fillets are cut into strips. The operation with hands immersed into cold water over a longer period is additionally a stress for the staff and may cause health risks.

2. **As a first step the investigation of 10 x 200g subsamples of a block (= 2kg sample unit) should be introduced.**

3. The final statistical evaluation of the results of the collaborative study (which is not yet concluded) may lead to the possibility of a further reduction of the sample unit, e.g. to 5 samples (1 kg) per block and to the construction of a more optimal sampling plan.

4. A further advantage of the modified WEFTA method (see enclosure) is its suitability for final products too (fish sticks and portions). It seems highly recommendable to use the same separation procedure for blocks and portions.

- April 1986

CONFERENCE ROOM DOCUMENT: FAO WORKING GROUP MEETING, Bremerhaven, April 1986

WEFTA-Proposal for insertion into ANNEX "E" of the "Proposed Draft Standard for QF Blocks of Fish Fillets, Minced Fish and Mixtures of Fillets and Minced Fish Flesh" (ALINORM 85/18, Appendix III) **and** into para 7.5. of the "Proposed Draft Standard for QF Fish Sticks and Fish Portions, Breaded or in Batter" (ALINORM 85/18, Appendix IV).

DETERMINATION OF PROPORTIONS OF FILLETS AND MINCED FLESH IN QUICK FROZEN BLOCKS AND PORTIONS

(Method proposed by N. Antonacopoulos, Fed. Rep. Germany, collaboratively studied by WEST EUROPEAN FISH TECHNOLOGISTS ASSOCIATION)

a) Equipment

Balance, sensitive to 0,1 g
circular sieve - 200 mm diameter, 2,5 or 2,8 mm mesh openings (ISO) soft rubber edge (or blunt) spatula, forks, suitable sized plates, water tight plastic bags.

b) Preparation of Samples

Fish Blocks of 7,6 kg (16 lbs), after examination on external defects of the whole block in frozen condition, are cut into 36 portions of 200 g each: 120 x 62,4 x 27 mm according to the annexed sampling plan. A sample unit of 10 selected samples (3, 9, 11, 15, 17, 20, 26, 30, 31, 34) = 2000 g is used for the fillet/mince separation. The rest of the block is used for further internal defect examination in thawed state.

Fish Portions: Take as many portions as needed to provide a fish core sample of at least 1000 grammes (1 kg). If breaded/battered **first strip** the coating according to the method described in para 7.4. of ALINORM 85/18, APPENDIX IV.

c) Determination of Weight "A" of the Frozen Fish Sample

Weigh the single fish portion from a block while **it is still frozen.** Smaller portions are combined to a sample unit of ca. 200 g (e.g. 10 fish-stick cores of ca. 20 g each). Place the pre-weighed samples into a water tight bag.

d) Thawing - Thaw the portions by immersing the bags **(e.g. 5 at a time)** into a gently **agitated** water bath of about 20°C, but not more than 25°C.

e) Draining - After thawing has been completed (duration about 20 - 30 min) take each sample unit, one at time, and drain the exuded fluid (thaw drip) for 2 minutes on a preweighed circular sieve inclined at an angle of 17 - 20 degrees. Remove adhering drip from the bottom of the sieve by use of a paper towel when draining is completed.

f) Determination of Weight "B" of the Drained Fish Sample and Weight "C" of the Thaw Drip

Determine the weight of the drained fish sample "B" = sieve + fish minus sieve weight. The difference of "A" - "B" = "C" is the weight of exuded fluid = thaw drip.

g) Separation - Place the drained fish core on a plate and separate the minced flesh from the fillet flesh using a fork to hold the fillet flesh and a soft, rubber edge, spatula to scrape off the minced flesh.

h) Determination of Weight "D" of the Fillet Proportion and "E" of the Mince Proportion

Weigh the fillet proportion "D" and the mince proportion "E" separately.

i) Calculation - After recording the single weights of "A", "B", "C", "D" and "E" the sum of each is counted. The proportion of minced flesh (M) and fillet flesh (F) and eventually thaw drip (T) is calculated as follows*):

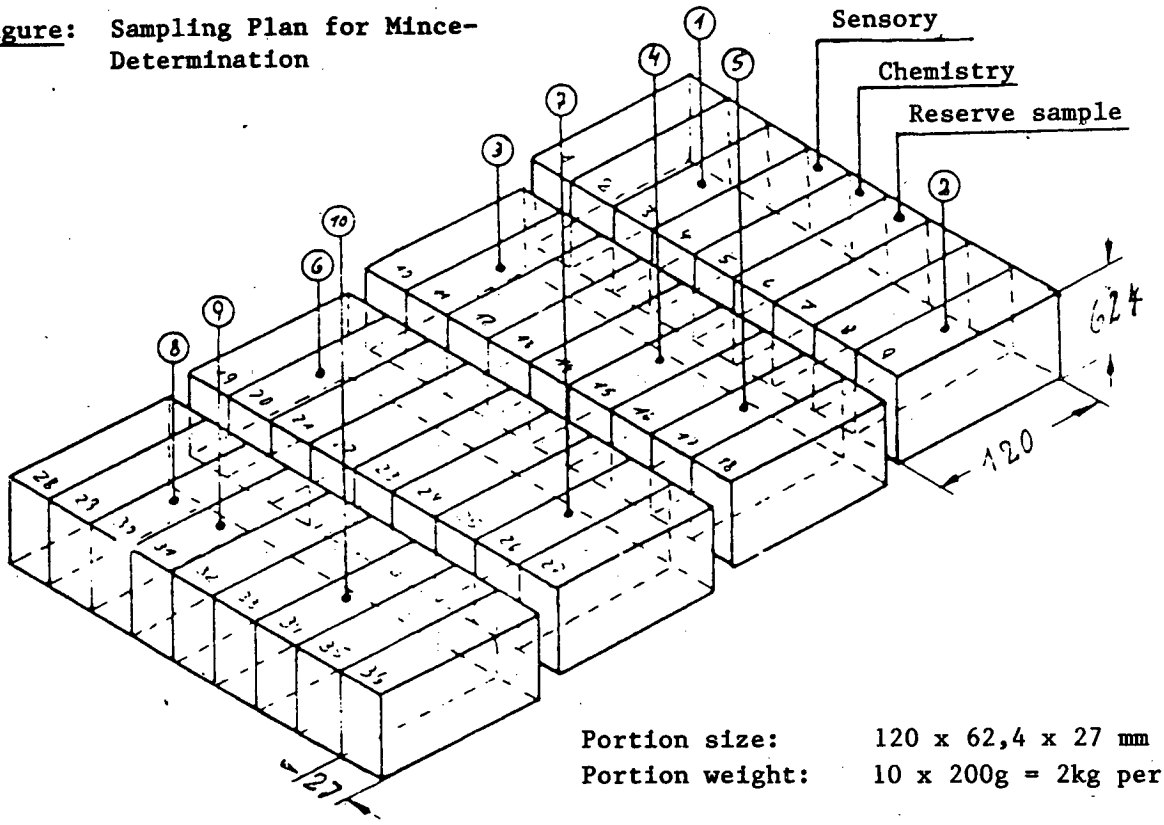
$$\% M = \frac{\text{sum of "E"}}{\text{sum of "B"}} \times 100$$

$$\% F = \frac{\text{sum of "D"}}{\text{sum of "B"}} \times 100$$

$$\% T = \frac{\text{sum of "C"}}{\text{sum of "A"}} \times 100$$

***) For the calculation of the mince proportions respective to the fillet proportions the thaw drip is disregarded, because it can be proportionally counted to the fillet with respect to the mince part. If the amount of drip exceeds 10%, addition of non fish moisture may be indicated.**

Figure: Sampling Plan for Mince-Determination



Portion size: 120 x 62,4 x 27 mm
Portion weight: 10 x 200g = 2kg per block

PROPOSED DRAFT STANDARD FOR QUICK FROZEN FISH STICKS (FISH FINGERS) AND FISH PORTIONS - BREADED OR IN BATTER

(Step 5)

1. SCOPE

This standard applies to quick frozen fish sticks (fish fingers) and fish portions cut from quick frozen fish flesh blocks or formed from fish flesh with breaded or batter coatings, singly or in combination, raw or partially cooked and offered for direct human consumption without further processing. This standard does not apply to natural fish fillets with breaded or batter coatings.

2. DESCRIPTION

2.1 Product Definition

2.1.1 A fish stick (fish finger) is the product including the coating weighing not less than 20 g (0.7 oz.) and not more than 50 g (1.8 oz.) shaped so that the length is not less than three times the greatest width. Each stick shall be not less than 10 mm thick.

2.1.2 A fish portion including the coating, other than products under 2.1.1, may be of any shape and size excluding fish sticks (fish fingers).

2.2 Process Definition

The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete until the product temperature has reached a level which will ensure that the temperature at the thermal center will not be higher than -18°C after thermal stabilization. The product shall be maintained under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. (See Code of Practice for Frozen Battered and/or Breaded Fishery Products - CAC/RCP 35-1985). The recognized practice of further processing of intermediate quick frozen material under controlled conditions followed by the re-application of the quick freezing process is permitted.

2.3 Presentation

(i) Raw breaded fish sticks (fingers)
(ii) Raw breaded fish portions
(iii) Partially cooked breaded fish sticks (fingers)
(iv) Partially cooked breaded fish portions
(v) Battered partially cooked fish sticks (fingers)
(vi) Battered partially cooked fish portions
(vii) Other presentations

Any other presentation of the product shall be permitted provided that it:

(a) is sufficiently distinctive from other presentations laid down in this standard;
(b) meets all the other requirements of the standard; and
(c) is adequately described on the label to avoid confusing or misleading the consumer.

The ingredients shall when appropriate be in agreement with the relevant Codex standard.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw Material

3.1.1 Fish

Quick frozen breaded or battered fish sticks (fish fingers) and breaded or battered fish portions shall be prepared from fish fillets or minced fish flesh or mixtures thereof, of edible species which are of a quality such as to be sold fresh for human consumption. The raw materials may be in the form of quick frozen blocks.

3.1.2 Coating

The coating used shall consist of ingredients fit for human consumption (see also Section 4).

3.1.3 Frying fat (oil)

A fat (oil) used in the cooking operation shall be suitable for human consumption and for the desired final product characteristics (see also Section 4).

3.2 Final Product

3.2.1 Minimum Requirements for Proportions of Fish Flesh Core: % of declared weight of final product: 50.

3.2.2 The products in the various forms of presentation shall comply with the definitions and essential quality factors as set forth in this standard and should not exceed the tolerance allowances as set forth in Annex B.

3.2.3 The product shall be free from objectionable odour, flavour and texture. If the product is presented under a species name, the odour, flavour and texture and the colour of the flesh shall be characteristic of the species or mixture of species used.

3.3 Optional Ingredients

Other ingredients may be used. They shall be suitable for human consumption and shall be free from abnormal taste, flavour or odour. Examples of such ingredients include: spices such as turmeric and paprika, herbs, vegetable seasonings, cereal flours, potato flour, sodium chloride, spice oils, glucose, lactose, dextrose, malt extract, skim milk powder, egg and corn syrup.

4. FOOD ADDITIVES

The maximum level in the final product is in proportion to the requirements given in 2.2.

4.1 FOOD ADDITIVES (For Fish Fillets and Minced Fish Flesh only)	Maximum level in the final product
4.1.1 Phosphates and Alginates	
4.1.1.1 Monophosphate, monosodium (Na or K orthophosphate)	5 g/kg expressed as P_2O_5, singly or in combination
4.1.1.2 Diphosphate, tetrasodium or tetrapotassium (Na or K pyrophosphate)	

4.1.1.3	Triphosphate, pentasodium or pentapotassium or calcium (Na, K or Ca tripolyphosphate)	)
4.1.1.4	Polyphosphate, sodium (Na hexametaphosphate)	)
4.1.1.5	Sodium alginate	5 g/kg
4.1.2	Antioxidant	
4.1.2.1	Ascorbic acid, sodium or potassium salts	) 1 g/kg expressed as ascorbic acid
4.1.2.2	Ascorbyl palmitate	)
4.2	In addition, for Minced Fish Flesh only:	
4.2.1	Antioxidants	
4.2.1.1	Citric acid and Na or K salts	1 g/kg
4.2.2	Thickening Agents	
4.2.2.1	Guar gum	)
4.2.2.2	Carob bean (locust bean) gum	)
4.2.2.3	Pectins	)
4.2.2.4	Carboxymethyl cellulose, sodium salt	) 5 g/kg singly or
4.2.2.5	Xanthan gum	)
4.2.2.6	Carrageenan	) in combination
4.2.2.7	Methyl cellulose	)
4.3	Food Additives for Bread or Batter	Maximum level in bread or batter
4.3.1	Leavening Agents	
4.3.1.1	Monocalcium phosphate	)
4.3.1.2	Dicalcium phosphate	)
4.3.1.3	Sodium aluminium phosphate	) Limited by G.M. P.
4.3.1.4	Sodium acid pyrophosphate	)
4.3.1.5	Sodium, potassium and ammonium carbonates	)
4.3.1.6	Sodium, potassium and ammonium bicarbonates	)
4.3.1.7	Sodium, potassium and ammonium carbamates	)
4.3.2	Flavour Enhancers	
4.3.2.1	Monosodium glutamate	) Limited by G.M.P.
4.3.2.2	Monopotassium glutamate	)
4.3.3	Acidifying agents	
4.3.3.1	Lactic acid	)
4.3.3.2	Citric acid or their Na and K salts	) 1 g/kg of the final product expressed as lactic or citric acid)
4.3.4	Colours	
4.3.4.1	Annatto 75120	)
4.3.4.2	Caramel	) Limited by G.M.P.
4.3.4.3	Canthaxanthin	)

4.3.5	Thickeners	
4.3.5.1	Guar gum	5 g/kg singly or in combination
4.3.5.2	Carob bean (Locust bean) gum	
4.3.5.3	Carrageenan	
4.3.5.4	Xanthan gum	
4.3.5.5	Pectins	
4.3.5.6	Sodium alginate	
4.3.5.7	Hydroxypropyl cellulose	
4.3.5.8	Hydroxypropyl methyl cellulose	
4.3.5.9	Methylethylcellulose	
4.3.5.10	Sodium carboxymethylcellulose	
4.3.5.11	Methyl cellulose	
4.3.6	Emulsifying agents	
4.3.6.1	Monoglycerides of fatty acids	5 g/kg of the final product singly or in combination
4.3.6.2	Lecithin, mono and diglycerides	
4.3.7	Chemically Modified Starches	
4.3.7.1	- Acid treated starches (including white and yellow dextrins)	Limited by G.M.P.
4.3.7.2	- Alkali treated starches	
4.3.7.3	- Bleached or oxidized starches	
4.3.7.4	- Distarch adipate, acetylated	
4.3.7.5	- Distarch glycerol	
4.3.7.6	- Distarch glycerol, acetylated	
4.3.7.7	- Distarch glycerol, hydroxypropyl	
4.3.7.8	- Distarch phosphate	
4.3.7.9	- Distarch phosphate, acetylated	
4.3.7.10	- Distarch phosphate, hydroxypropyl	
4.3.7.11	- Distarch phosphate, phosphated	
4.3.7.12	- Monostarch phosphate	
4.3.7.13	- Starch acetate	
4.3.7.14	- Starch, hydroxypropyl	

5. HYGIENE AND HANDLING

5.1 When tested by appropriate methods of sampling and examination, the product:

(a) shall be free from microorganisms in amounts which may represent a hazard to health;
(b) shall be free from parasites which may represent a hazard to health; and
(c) shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the following codes:

(i) the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1);

(ii) the Code of Practice for Frozen Fish (CAC/RCP 16-1978, Vol. B);

(iii) the Draft Code of Practice for Minced Fish (CAC/RCP 27-1983, Vol. B);

(iv) the Code of Practice for Frozen Battered and/or Breaded Fishery Products (CAC/RCP 35-1985).

6. LABELLING

In addition to Sections 1, 2, 4 and 6 of the Recommended International General Standard for the Labelling of Prepackaged Foods (CAC/RS 1-1969) the following provisions apply, subject to endorsement by the Codex Committee on Food Labelling.

6.1 Name of the Food

6.1.1 The name of the food shall be "breaded fish sticks" (fish fingers), "breaded fish portions", "battered fish sticks", (fish fingers) or "battered fish portions" as appropriate or other specific name used in accordance with the law and custom of the country in which the food is sold and in a manner so as not to mislead the consumer.

6.1.2 The label may, in addition, include reference to the species or mixture of species.

6.1.3 In addition there shall appear on the label either the term "quick frozen" or the term "frozen" whichever is customarily used in the country in which the food is sold, to describe a product subjected to the freezing processes as defined in sub-section 2.2

6.1.4 Where the pack contains products which are not reasonably uniform in size, this shall be shown clearly on the label.

6.1.5 The label may show whether the products are prepared from minced fish flesh, fish fillets or a mixture of both.

6.1.6 Products prepared from raw material from which the pin bones are not removed shall be labelled accordingly in close proximity to the name of the food.

6.2 List of Ingredients

A complete list of ingredients, using generic terms where appropriate, shall be declared on the label in descending order of proportion. The provisions of sub-section 3.2(b) and 3.2(c) of the Recommended International General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1981)* shall also apply.

6.3 Net Contents

The net content shall be declared by weight in either the metric system ("Systeme international" units) or avoirdupois or both systems of measurement as required by the country in which the food is sold.

6.4 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the food shall be declared.

6.5 Country of Origin

The country of origin of the product shall be declared if its omission would mislead or deceive the consumer.

6.6 Lot Identification

Each container should be permanently marked in code or in clear to identify the producing factory and the lot.

6.7 Storage Conditions

The label shall include information on proper storage conditions.

6.8 Cooking Instructions

The label should include cooking instructions.

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* Will be revised.

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7. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis described hereunder are international reference methods which are to be endorsed by the Codex Committee on Methods of Analysis and Sampling.

7.1 Sampling for Destructive Examination

Sampling of lots for examination of the product shall be in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL-6.5)(CAC/RM 42-1969).

7.2 Organoleptic Examination

Organoleptic assessment of the product shall be made only by persons trained in such assessment.

7.3 Determination of Net Weight

The net weight (exclusive of packaging material) of each sample representing a lot shall be determined in the frozen state.

7.4 Estimation of Fish Flesh Core

The fish flesh core is estimated according to A.O.A.C. method 18.002 (13th Edition 1980) or an alternative method under development.

7.5 Candling Procedure for the Detection of Parasites

Parasites are detected by placing a sample on a 5 mm thick acryl sheet with 45% translucency and candled with a light source giving 1500 lux 30 cm above the sheet.

Parasitic infestation may be detected by this candling procedure, by visual examination or by any other suitable method.

8. CLASSIFICATION OF DEFECTIVES

8.1 A sample unit of product which fails to meet the requirements of Section 3.2 and Annex C shall be considered "defective".

9. LOT ACCEPTANCE

A lot will be considered as meeting the final product and weight requirements of this standard when the total number of "defectives" as classified according to Annex C does not exceed the acceptance number (c) of the appropriate sampling plan in the Sampling Plans for Prepackaged Foods (AQL-6.5)(CAC/RM 42-1969) and when the average net contents of all containers examined is not less than the declared weight provided there is no unreasonable shortage in individual containers.

ANNEX "A"

METHODS OF COOKING QUICK FROZEN FISH STICKS (FISH FINGERS) AND FISH PORTIONS - BREADED OR IN BATTER

The frozen sample shall be cooked prior to organoleptic assessment according to the cooking instructions on the package. When such instructions are not given, or equipment to cook the sample according to the instructions is not obtainable, the frozen sample shall be cooked according to the applicable method(s) given below:

The following procedures are based on procedure 18.003 of the A.O.A.C. (13th Edition 1980). It is based on heating product to an internal temperature $\geq$70°C (160°F). Cooking times vary according to size of product and equipment used. If determining cooking time, cook extra sample, using temperature measuring device to determine internal temperature.

In the procedures given below, conversions between metric units and Fahrenheit, inches or ounces have been rounded for ease of measurement. Slight variations in these units are acceptable as long as the product is heated to an internal temperature ≥ 70°C (160°F).

PARTIALLY COOKED FISH STICKS (FISH FINGERS) OR FISH PORTIONS (OF ANY SIZE OR SHAPE)

Baking Procedure

Distribute product evenly on a flat cookie sheet or shallow flat pan. Heat in ventilated oven, preheated to 200°C (400°F) until internal temperature of product reaches 70°C (160°F).

RAW BREADED FISH STICKS (FISH FINGERS) (Weight of each stick (finger) as defined in Sub-Section 2.1.1)

Shallow Frying

Place liquid or hydrogenated cooking oil to a depth of 3 mm (1/8") in a frying pan. The oil should be hot before adding the product. Cook for 8 minutes turning the product once.

Deep Fat Frying

Use a deep fat fryer with 5 cm (1 7/8") of oil preheated to 180°C (360°F) and cook the product for 4 minutes.

Grilling

Space the product evenly on base of grill pan. Grill the product for 10 minutes turning once during this time and adjusting the heat if necessary.

RAW BREADED FISH PORTIONS (Weight of each portion not less than 50g (1. 8 oz) and not more than 70 g (2.5 oz)

Shallow Frying

Place liquid or hydrogenated cooking oil in a frying pan to give approximately 6 mm. (1/4") depth. With medium heat of 175°C (350°F), cook the product for 10 minutes turning once.

Deep Fat Frying

Use a deep fat fryer with 5 cm (1 7/8") of oil. Pre-heat the fat to 175°C (350°F) and cook the product for 5 minutes.

An Alternative Method of Cooking

Cooking times vary according to size of the product and equipment used; for battered/breaded products a uniform colour and crispness of the coating have to be obtained as well. Cooking time is based on heating the product to an internal temperature +70°C (according to A.O.A.C. Method 18.003)(14th Edition-1984). Turning shall be carried out twice at -5°C and +50°C respectively. If determining cooking and turning times, cook extra sample, using temperature measuring device to determine internal temperature. The product shall, before cooking, be adjusted to ca. -18°C to achieve standard cooking conditions.

Shallow frying

Place liquid or hydrogenated cooking oil/fat of neutral taste into a frying pan, preferably with thermostatically adjustable temperature. The melted fat of approximately 3 mm depth shall be preheated to 170°C before adding the product (e.g. the control lamp switches off, when the adjusted temperature is reached, but the samples should not be added before the control lamp switches on again, to come into the heating phase of the pan).

Examples

Fish sticks of 30 g (8.5 x 2.4 x 1.5 cm) take about 6 minutes and should be turned after 1.5 and 4 minutes respectively. Fish portions of 100 g(10 x 6 x 1.8 cm) take about 12 minutes and should be turned after 3 and 8 minutes respectively.

ANNEX B

DEFECT TABLES IN STANDARD FOR QUICK FROZEN FISH STICKS (FISH FINGERS) AND FISH PORTIONS - BREADED OR IN BATTER

Note: Sample unit 1 kg of packed whole product. The total number of demerit points to be calculated on a 1 kg basis and recorded to the nearest whole number.

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
A. FROZEN STATE		
DEFECTS OF FINAL PACK		
1. Absence of surplus loose coating Any excessive amount of loose material in the package.	Over 1% of declared net content - each instance of 1% in each pack.	1
2. Excessive Fat (oil) Perceptible amounts of oil which have stained the inside of and soaked through the packaging.	Each pack affected with staining or oil soaked through the packaging	1
DEFECTS OF WHOLE PRODUCT	FROZEN STATE (sample unit 1 kg of whole product)	
3. Ease of separation Upon removal from the pack in the frozen state, units should separate easily by slight force exerted by hand without damage and without packing material sticking to the surface.	More than 40% of the sticks (fingers) or portions in a unit that cannot be separated by hand without damage.	Defective
	20-40% of the sticks (fingers) or portions in a unit that cannot be separated by hand without damage.	8
	10-20% of the sticks (fingers) or portions in a unit that cannot be separated by hand without damage.	4
4. Broken and Damaged Products Broken products which have been separated into two or more pieces.	a) Separated into two or more pieces (i) Sticks/portions ≤ 50g, each instance	4
	(ii) Portions > 50g, each instance	8
Damaged products which have been squashed, mashed or otherwise mutilated to an extent that appearance is materially affected.	b) Squashed or mashed (i) Sticks/portions ≤ 50g, each instance	4
	(ii) Portions > 50g, each instance	8
A crack is a break in the coating greater than 10 mm in length which extends into the flesh.	c) Cracked, each instance	1

5. Coating Defects		
(Not arising as a result of the assessment of separation). Surface areas devoid of coating.	Devoid of coating: a) Sticks/portions ≤ 50g (i) Areas > 1 cm^2 up to and including 3 cm^2.	4
	(ii) Each additional complete area of 3 cm^2	4
	b) Portions > 50 g (i) Areas > 2 cm^2 up to and including 5 cm^2	4
	(ii) Each additional complete area of 5 cm^2	4
Non-uniformity of coating(surface defects), including surplus coating or pre-cooking defect.	Non-uniformity of coating: - each instance	1
6. Discolouration of Coating		
a) Colour of individual fish sticks (fingers) or portions which are black or very dark brown.	a) Black or very dark brown - first instance	8
	More than 2 sticks, or more than 1 portion, > 50g	Defective
b) Colour significantly different from other units in the sample.	b) Colour significantly different from other sticks/portions in the sample - each instance	4
c) Discolouration of the total sample which is not typical for the product.	c) Colour not typical	Defective
d) Widespread black spots derived from burnt bread crumbs.	d) Black spots - each stick/ portion affected	8
7. Size uniformity of the coated product as measured by weight.	[± 20%] of the nominal weight of the coated stick/portion.	[2]

DEFECTS OF THE FISH CORE

(Sample unit - stripped core from 1 kg of whole product)

8. Size uniformity		
Of the decoated core as measured by weight, ice pockets and air pockets which result in damage during cooking and/or in under-weights.	a) [± 20%] of the nominal weight of the decoated stick portion.	[2]
	b) Ice pockets (i) Sticks/portions ≤ 50g - each pocket with a surface area > 1 cm^2 up to and including 3 cm^2	2
	Each additional complete area of 3 cm^2	2
	(ii) Portions > 50g - each pocket with a surface area > 2 cm^2 up to and including 5 cm^2	2

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
	Each additional complete area of 5 cm^2	2
	c) Air pockets Each pocket with a surface area > 1 cm^2 up to and including 3 cm^2 and with a depth > 3 mm	1
	Each additional complete area of 3 cm^2	1
9. Dehydration Deep dehydration is an excessive loss of moisture from the surface of the sample unit which shows clearly on the surface and cannot be easily removed by scraping	Each instance > 5 cm^2 up to and including 10 cm^2	2
	Each additional complete area of 10 cm^2	4
B. THAWED STATE DEFECTS OF THE FISH CORE (Sample unit = stripped core from 1 kg of whole product)		
10. Skin and black membrane Skin Does not include sub-cutaneous layer (silver lining). In flat fish white skin is not regarded as defect. 1/	a) Skinless fillet (i) Each piece greater than 3 cm^2 up to and including 10 cm^2	4
	(ii) Over 10 cm^2 each additional complete area of 5 cm^2 or part thereof.	2
Black membrane or belly-lining Does not include white membrane	b) Skin on fillet (i) Each instance greater than 3 cm^2 up to and including 10 cm^2	4
	(ii) Over 10 cm^2 each additional area of 5 cm^2 or part thereof	2
11. Scales - attached to skin	a) Skin-on fillet - scaled (i) Each area of scale greater than 3 cm^2 up to and including 10 cm^2	2*
	(ii) Each additional complete 5 cm^2 or part thereof	2*
- readily noticeable loose scales	b) Skinless fillet (i) First 5 to 10 (in the case of hake fillets 10 to 20)	2
	(ii) If more than 10 (for hake 20) loose scales each additional complete unit of 5 (for hake 10)	2

* for ocean perch fillets only - 1 demerit point only

1/ In Skinless Flat Fish, small pieces of white skin are not regarded as defects provided that the skin does not exceed more than 10% of the surface area of the fillets in the sample unit.

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
12. Colour Defects		
Blood clots (spots) Any mass or lump of clotted blood.	a) Each clot greater than 5 mm in diameter	2
Bruises Diffused blood causing distinct reddish, brownish or other off-colouration.	b)(i) Any aggregate area of discolouration or bruising exceeding 3 cm^2 up to and including 5 cm^2	2
Discolouration Appears as significantly intense discolouration due to melanin deposits, bile stains, liver stains or other causes.	(ii) Each additional area of 5 cm^2 or part thereof.	2
Minced part of cores from mixed blocks of fillets and mince: objectionable discolouration, spots or particles derived from skin, black and white membrane, blood clots, blood spots, spinal cord or viscera.	c) Minced part: (i) Distinctly discoloured, spotted or otherwise heavily deviating from the colour of the species.	Defective
	(ii) Objectionable deviation from the colour of the fillet	2
Core from minced blocks: Discolouration, blood clots, skin, membrane, scale, viscera, spinal cord.	d) Minced core: (i) 10-25 instances	2
	(ii) over 25, each additional 15 instances or part thereof	2
Overall discolouration:	e)(i) Distinctly discoloured or otherwise deviating from the colour of the species	Defective
	(ii) Readily noticeable deviation from the colour of the species	2
13. Fins or part of fins		
Two or more bones connected by membrane, including internal or external bones, or both in a cluster	Any instance where a bone in the fin exceeds 40 mm in length.	Defective
	Each separate instance up to and including 3 cm^2.	4
	Each additional 3 cm^2 or part in the same cluster.	2

DEFINITION OF DEFECTS	DEFECT DESCRIPTION	DEMERIT POINTS
14. Bones Defect bones A bone is regarded as a defect if its length is ⩾ 10 mm or its diameter is ⩾ 1 mm; a bone ⩽ 5 mm in length is not to be considered as a defect if its diameter is not > 2 mm. The foot of a bone (where it has been attached to the vertebra) shall be disregarded if its width is < 2 mm or if it can be easily stripped off by a finger nail.	a) Fillet with pin bone removed. (i) Each defect bone	2
	(ii) Each critical bone	Defective
	b) Fillet with pin bone in. (i) Each defect bone excluding pin bones	2
	(ii) Each critical bone excluding pin bones	8
Critical degree of bone defect Each defect bone whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40.0 mm and a width of 10.0 mm.		
Core from minced blocks:	a) Each bone defect Each critical bone	2 Defective
	b) Bone material in amounts exceeding 0.2% (calculated as calcium).	Defective
15. Viscera Any portion of the internal organs.	Each instance	8
16. Parasites Parasites or parasitic infestation detected by the candling procedure or any other non-destructive physical means. Each parasite infestation may be recognised by its colour, its effect on softening the fish flesh or by other physical indication.	Each parasite with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length.	4
	Each parasite with a capsular diameter smaller than 3 mm or a parasite not encapsulated and smaller than 10 mm in length.	2
	Each fillet affected by any significant parasitic infestation	8

17.	Foreign Matter (i) Any material not derived from fish or not permitted by the standard other than packaging.	Each instance	Defective
	(ii) Packaging material	Each instance	[2]
18.	Odour Objectionable odour in thawed state	Any odour which is distinctly objectionable	Defective
19.	Texture Any texture which in the thawed state is significantly different to the characteristics of the species.	Distinctly objectionable, e.g. the flesh is definitely spongy, rubbery, mushy, soft, gelatinous, tough or gritty.	Defective

C. COOKED STATE

WHOLE PRODUCT

(Extra sample unit 200g of whole product)

20.	Appearance and coating defects Discolouration: black or dark brown or other abnormal colours which were not apparent in the frozen state.	Significantly abnormal colour deviations of units in the sample (i) each stick/portion (ii) whole sample	4 Defective
	Damage: blistering, cracking or detachments of coating.	Coating distinctly blistered, cracked, or detached - each stick or portion	4
21.	Odour and Flavour Any odour and flavour which is distinctly objectionable.	Each instance	Defective
22.	Texture Any texture which is significantly different to the characteristic of the species or the type of product	Definitely not characteristic of the species or type of product e.g. mushy, soft, gelatinous, spongy, rubbery, tough, crumbly, gritty or slimy. Each instance	Defective

MAXIMUM ALLOWABLE TOLERANCE FOR DEFECTS: The sample will be considered to be defective if the total number of all demerit points from the examination of the whole product, the core and the cooked sample exceeds [40] for all members of the families Gadidae and Merluccidae or [50] for members of other species.1/

1/ For alternative proposal see paras. 27 and 28 of the Report of the Working Group (Appendix XIV).

CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

Oslo, 5th-9th May 1986

Sampling Plans

A Working Group was convened to consider alternative sampling plans for frozen fish blocks proposed by the Codex Committee on Methods of Analysis and Sampling (CCMAS). The Working Group met on 5th May 1986. Those attending were:

K.J. Dale	United Kingdom (Chairman)
R. Bourgue	Canada
A. Birch	Denmark
C. Simonnet	France
J. Oehlenschläger	Germany, Federal Republic of
G. Hallgrimsdottir	Iceland
G. Valdimarsson	Iceland
N. Losnegard	Norway
O. Bindschedler	Switzerland
R. Kirk	United Kingdom
A. Rainosek	United States of America

The Committee during its 16th Session (1984) discussed the problems of cost and effect involved in sampling a consignment of fish blocks using the Codex Sampling Plans for Prepackaged Foods (CAC/RM-42-1969). The Committee agreed to ask the CCMAS to help develop an alternative plan which required a smaller sample size but had equivalent performance characteristics and was statistically sound.

The Working Group considered the response of the CCMAS to this request which was contained in Document CX/MAS 86/6 (Revised).* The CCMAS had followed the Draft General Principles for the Establishment or Selection of Codex Sampling Procedures and noted that the principal area of concern was for the examination of consignments in the region of 20 tonnes.

The Working Group approved the proposal from the CCMAS and agreed to recommend to the Committee acceptance of the alternative sampling plan.

France expressed concern over the definition of "lot". Whilst the Working Group understood this concern, it was agreed that it would be too complex to attempt to elaborate a clearer definition. Despite the presence of a Codex definition of "Lot" it was noted that in nearly all cases in the real world the actual definition applied was by agreement between supplier and customer.

The Working Group suggested that in all future considerations of sampling plans that operating characteristic (OC) curves, or at least three reference points (e.g. AQL, Indifference value and RQL) for each plan be available to the Committee.

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* Attached.

The Working Group noted the investigation being undertaken by the Federal Republic of Germany to evaluate the possibility of using a sub-sample of the block for quality assessment. The Group expressed its interest and asked to see the final report in due course.

The Working Group expressed its thanks to Dr. Rainosek for his invaluable help in explaining the CCMAS proposal and guiding the group in its deliberations.

codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

JOINT OFFICE: Via delle Terme di Caracalla 00100 ROME: Tel. 57971 Telex: 610181 FAO I. Cables Foodagri

Agenda Item 6.6

CX/MAS 86/6
March 1986
Revised

ATTACHMENT

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON METHODS OF ANALYSIS AND SAMPLING

Fifteenth Session
Budapest, 10-15 November 1986

Report on Alternative Sampling Plans for Frozen Fish Blocks by the Working Group of the Codex Committee on Methods of Analysis and Sampling

At the 15th Session of the Codex Committee on Fish and Fishery Products (CCFFP) the United States reported that testing a subunit (2-5 lbs) of a fish block to determine the presence, frequency, and intensity of defects in large fish blocks (16.5 and 18.5 lbs) produced erroneous results because of the non-uniformity of distributiuon of the defects in the fish blocks. As a solution, the U.S. proposed that the entire content of the fish block be examined by the appropriate authority when testing lots (consignments) of the fish blocks for compliance with a Codex Standard. A question was raised about the adverse economic implications of sampling consignments of the fish blocks using the Codex Sampling Plan for Prepackaged Foods (CAC/RM 42 - 1969) when the entire contents of the block would be destroyed due to destructive evaluation for defects. The CCFFP at its 16th Session agreed to invite the Codex Committee on Methods of Analysis and Sampling (CCMAS) for guidance in developing an alternative but statistically reliable sampling schedule that would represent a reduction in the number of samples required for testing.

At its 14th Session, the CCMAS established a Working Group to examine and propose an alternative sampling schedule in response to the request of the CCFFP. Members of the Working Group included representatives of Norway, Canada, United Kingdom, United States and the Netherlands.

The Working Group reviewed the following relevant documents in its deliberations on a modified sampling schedule for fish blocks:

w/s 0205

Reference Document

1. Report on the 16th Session of the Codex Committee on Fish and Fishery Products.

2. Report of the 13th Session of the Codex Committee on Methods of Analysis and Sampling (Alinorm 83/23 Appendix IV) General principles for the Establishment or Selection of Codex Sampling Procedures

3. Draft Application of the General Principles for the Establishment or Selection of Codex Sampling Procedures: Notes for Guidance for Codex Commodity Committees Step 5), (being elaberated by the CCMAS).

4. FAO/WHO Codex Alimentarius Sampling plans for Prepackaged Foods - CAC/RM 42 -1969.

The Working Group noted the discussion on inspection levels in section 6.4 (page 12) of the Draft Application of the General Principles (Reference Document 3) which suggests that -- "level 4 be regarded as the normal level for sampling lots. If no health risks are involved and sampling costs are a major consideration, a lower level may be used."

The Working Group of CCMAS on Alternative Sampling Sampling Plans for Fish Blocks recommends that the solution of this problem be resolved within the applicational context of the draft General Principles (Reference Document 3) and proposes an attribute sampling schedule for fish blocks with selected performance characteristics based on Inspection Level 1. The proposed sampling schedule is presented in Attachment I and includes its performance characteristics with an example interpretation. For reference purposes, the Codex Sampling Plan for Prepackaged Foods is presented in Attachment II. Attachment III provides a comparison of these two sampling schedules. The following highlights are noted:

1. Both schedules offer sampling plans with similar performance characteristics (Note the percentages in the "Present Defective Which May be Accepted etc." column).

2. For the General Principles example schedule, the major reductions in required sample sizes with negligible to slight differences in the chances of lot acceptance occur when lot sizes range from 33,001 - 52,800 pounds and over 118,000 pounds, and to a lesser degree when lot sizes are less than 2476 pounds.

3. For the Prepackaged Foods schedule, the sample size is less (6 instead of 8) for lot sizes between 2476 and 9900 pounds.

4. For all other lot sizes, the two sampling schedules are essentially equivalent.

Adoption of the proposed schedule for Sampling Frozen Fish Blocks (Attachment I) by the Codex Committee on Fish and Fishery products will, for most lot sizes, decrease the economic loss due to sampling and evaluating products for compliance with the Codex Standard for Quick Frozen Fish Blocks.

SAMPLING SCHEDULE FOR FISH BLOCKS

Lot Size (Number of blocks)	Sample Size (Number of blocks to be tested) (n)	Acceptance Number (c) [1]	Percent Defective Which May Be Accepted Of The Time		
			95% [2]	50%	10% [3]
≤15	2	0	2.5	28.0	68.0
16-50	3	0	1.7	21.0	54.0
51-150	5	1	7.6	31.0	58.0
151-500	8	1	4.6	20.0	41.0
501-3200	13	2	6.6	20.0	36.0
3201-35000	20	3	7.1	18.0	30.0
>35000	32	5	8.5	18.0	27.0

1/ If the number of defective blocks in the sample is less than or equal to c, accept the lot; otherwise, reject the lot.

2/ For those accustomed to working with a Producer's Risk of 5%, the percent defective in this column represents the corresponding AQLs.

3/ For those accustomed to working with a Consumer's Risk of 10%, the percent defective in this column represents the corresponding RQLs.

Example Interpretation:

Suppose a lot containing 2500 fish blocks is to be inspected. The above sampling schedule calls for the sampling plan n=13 c=2. That is, 13 blocks would be inspected and if 2 or less are defective, the lot would be accepted; if 3 or more are defective, the lot would be rejected. For this sampling plan, a lot having 6.6% defective blocks would be accepted 95% of the time, a lot having 20.0% defective blocks would be accepted 50% of the time, and a lot having 36.0% defective blocks would be accepted 10% of the time. In other words, this sampling plan has an AQL= 6.6% (Producer's Risk = 5%) and a RQL = 36.0% (Consumer's Risk= 10%).

ALINORM 87/18
APPENDIX VI

PROPOSED DRAFT STANDARD FOR DRIED SALTED FISH (KLIPPFISH) OF THE GADIDAE FISH FAMILY
(at Step 6)

1. SCOPE

This Standard applies to dried salted fish of the species as defined below and offered for consumption without further processing.

2. DESCRIPTION

2.1 Product Definition

Dried salted fish is the product obtained from fish:

(a) of the species belonging to the family Gadidae; and

(b) which has been bled, gutted, beheaded, split or filleted, washed, salted and dried. All parts of the fish shall have reached salt/water equilibrium prior to drying.

2.2 Process Definition

The product shall be prepared by one of the salting processes defined in 2.2.1 and one or both of the drying processes defined in 2.2.2 and according to the different types of presentation as defined in 2.3.

2.2.1 Salting

(a) Dry Salting (kench curing) is the process of mixing fish with suitable food grade salt and stacking the fish in such a manner that the excess of the resulting brine drains away; and

(b) Wet Salting (pickling) is the process whereby fish is mixed with suitable food grade salt and stored in watertight containers under the resultant brine (pickle) which forms by solution of salt in the water extracted from the fish tissue. The fish is subsequently removed from the container and stacked so that the brine drains away.

2.2.2 Drying

(a) Natural Drying - the fish is dried by exposure to sun and wind; and

(b) Artificial Drying - the fish is dried in mechanically circulated air the temperature and humidity of which may be controlled.

2.3 Presentation

Dried salted fish shall be presented, with or without the black membrane (belly lining), scaled or unscaled, in one of the following ways:

2.3.1 Split fish - split and with approximately the anterior two thirds of the backbone removed.

2.3.2 Split fish with entire backbone - split with the whole of the backbone not removed.

2.3.3 Other presentation: any other presentation of the product shall be permitted provided that it:

(i) is sufficiently distinctive from the other forms of presentation laid down in this Standard;

(ii) meets all other requirements of this Standard; and

(iii) is adequately described on the label to avoid confusing or misleading the consumer.

2.3.4 Individual containers shall contain only one form of presentation from only one species of fish.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Raw Material

The raw material shall be salted fish prepared from sound fresh fish of the designated species which are of a quality such as to be fit to be sold for human consumption, and shall be fully salted.

3.2 Salt

Salt used to produce dried salted fish shall be clean and not previously used, free from foreign matter and foreign crystals, show no visible signs of contamination with dirt, oil, bilge or other extraneous materials and comply with the requirements laid down in the Code of Practice for Salted Fish.

3.3 Final Product

3.3.1 Appearance

Dried salted fish shall not be extensively cracked or ragged or completely broken, nor shall the belly wall have been decomposed by the action of liver, bile or gut contents. It shall not be completely pressed together nor show severe signs of liver staining, severe burning during the drying process, pronounced evidence of halophilic mould (dun) nor visible evidence of red, halophilic bacteria (pink).

3.3.2 Sensory characteristics

Dried salted fish shall have organoleptic properties which are characteristic of the product and shall be free from any objectionable odour.

3.3.3 The products in the various forms of presentation shall comply with the definitions and essential quality factors set forth in this Standard subject to tolerance allowances as set forth in Annex B.

4. FOOD ADDITIVES

(subject to endorsement by the Codex Committee on Food Additives).

4.1 Preservatives

	Maximum Level
Sorbic acid and its calcium, sodium and potassium salts.	1 g/kg solution for surface treatment only. 0.6 mg/cm² surface of the product.

5. HYGIENE AND HANDLING

5.1 It is recommended that the product covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the following codes:

(i) Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 1).

(ii) Recommended International Code of Practice for Fresh Fish (CAC/RCP 9-1976).

(iii) Recommended International Code of Practice for Salted Fish (CAC/RCP 26-1979)

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:

(a) shall be free from micro-organisms in amounts which may represent a hazard to health;

(b) shall be free from parasites which may represent a hazard to health; and

(c) shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

Any container for dried salted fish shall be clean and dry and shall protect the organoleptic and other quality characteristics of the product during storage and transport. It shall not pass on to the product any foreign odour, flavour, colour or other foreign characteristics.

7. LABELLING*

(Subject to endorsement by the Codex Committee on Food Labelling).

In addition to Sections 1, 2, 4 and 6 of the Recommended International General Standard for the Labelling of Pre-packaged Foods (CAC/RS 1-1969) the following specific provisions apply:

7.1 Name of the Food

7.1.1 The name of the product as declared on the label shall be "dried salted fish", or "klippfish" or other designations according to the law, custom or practice in the country in which the product is to be distributed. In addition, there shall appear on the label in conjunction with the name of the product, the name of the species of fish from which the product is derived.

7.1.2 For forms of presentation other than described in 2.3.1 "split fish" the form of presentation shall be declared in conjunction with the name of the product in accordance with sub-section 2.3.2 as appropriate. If the product is produced in accordance with Sub-section 2.3.7, the label shall contain in close proximity to the name of the food, such additional words or phrases that will avoid misleading or confusing the consumer.

7.2 Net Contents

The total net contents shall be declared by weight in either the metric system ("Systeme International" units) or avoirdupois or both systems of measurement as required by the country in which the product is sold.

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* Sections on List of Ingredients and Labelling of Non-Retail Containers will be added when the Labelling Section is revised in accordance with the Revised General Standard for the Labelling of Pre-Packaged Foods.

7.3 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the product shall be declared.

7.4 Country of Origin

7.4.1 The country of origin shall be declared if its ommission would mislead or deceive the consumer.

7.4.2 When the product undergoes further processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purpose of labelling.

7.5 Lot Identification

Each container shall be permanently marked in code or in clear to identify the producing factory and the lot.

8. METHODS OF SAMPLING, EXAMINATION AND ANALYSIS

The methods of sampling, examination and analysis described hereunder are international reference methods.

8.1 Sampling

8.1.1 Sampling for Organoleptic examination.

For those provisions detailed in Sub-sections 2.3 and 3.3 of this Standard, sampling shall be carried out in accordance with FAO/WHO Codex Alimentarius Plans (to be elaborated).

8.1.2 Sampling for Net Weight shall be carried out in accordance with the FAO/WHO Sampling Plans for the Determination of Net Weight (under elaboration).

8.2 Examination of Physical Defects and Organoleptic Assessment

Organoleptic and physical assessment of the product shall be made only by persons trained in such assessment.

9. CLASSIFICATION OF DEFECTIVES

A sample unit shall be considered as a "defective" when it fails to meet the requirements of Sub-sections 2.3 and 3.3 subject to the defect definitions and tolerances in Annex A.

10. LOT ACCEPTANCE

A lot will be considered as meeting the final product requirements of this Standard when:

(a) the total number of "defectives" as defined in Section 9 of this Standard does not exceed the acceptance number (c) of the appropriate sampling plans in the Sampling Plans for Pre-Packaged Foods (AQL 6.5 CAC RM 42-1969).

(b) and when the average net contents of all containers examined is not less than the declared weight provided that there is no unreasonable shortage in individual containers.

ANNEX A

PROPOSED DEFECT TABLE FOR DRIED SALTED FISH (KLIPPFISH)

A sample unit consists of 10 fish withdrawn at random from the primary packing unit.

A. GENERAL DEFECTS

(Section 3.3)

	Defect Description	Demerit Points
1.	Extensively Cracked	
	More than 2 instances each instance	Defective 24
2.	Extensively Ragged	
	More than 2 instances each instance	Defective 24
3.	Completely Broken	
	More than 2 instances each instance	Defective 24
4.	Decomposed by Liver Action, Bile or Gut Content	
	At least 3/4 of one belly wall: each instance from 1/3 up to 3/4 of one belly wall: each instance	24 12
5.	Signs of Liver Staining	
	Severe: More than 1/2 of the fish side: each instance	12
6.	Completely Pressed together	
	Each instance	15
7.	Severe Burning	
	More than 1 instance each instance	Defective 36
8.	Halophilic Mould (Dun)	
	Pronounced evidence: on more than 1/3 of the fish-flesh side - more than 2 instances each instance	Defective 24
9.	Red Halophilic Bacteria (Pink)	
	Visible evidence: 1 instance	Defective
10.	Odour and Flavour	
	Any odour or flavour which is objectionable: 1 instance	Defective
11.	Extraneous Matter	
	Sand and/or alien/coloured particles on more than 1/4 of the fish-flesh surface or 1/2 of the skin-side: more than 4 instances each instance	Defective 12

B. DEFECTS REGARDING PRESENTATION (Sub-section 2.3)

1. **Designated Without Black Membrane (White Wings)**

The entire or major parts of the black membrane:	
more than 3 fish	Defective
each instance	16

2. **Designated Scaled**

Unscaled fish: more than 4 fish	Defective
Unscaled or partly unscaled fish: each instance	4

3. Split Fish (2.3.1)

Not split: each instance	36
Entire backbone: each instance	36

4. Pieces or Fillets (2.3)

Pieces of fish: more than 2 pieces	Defective
each instance	16

5. Other Species (2.3.4)

Fish species other than designated:

more than 2 instances	Defective
each instance	16

DEFECTIVE UNIT

A sample unit shall be considered a defective if it is found to be DEFECTIVE or is allocated MORE THAN 48 DEMERIT POINTS.

PROPOSED DRAFT CODE OF PRACTICE FOR CEPHALOPODS

Step 5

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INTRODUCTION

This code of practice has been written for the use of those engaged in the cephalopod processing industry. It contains technological and essential hygiene requirements for the preparation of high-quality cephalopod products, and is based on long-established and widely recognized good commercial practices.

This code is intended also as background information or as a guideline for the elaboration of national quality standards, quality control and fish inspection programmes in countries where these have not yet been developed.

However, it must be acknowledged that most of the practical information pertaining to the hygiene and technology of cephalopod processing has been gained from the industrial experience of very few countries. With this limitation in mind, this code should, therefore, not be regarded as a set of rules to be followed explicitly without any concern for local conditions.

The information provided is not intended to replace the advice or guidance of trained and experienced technologists regarding the complex technical problems which might be unique to a specific geographical area.

In some countries, cephalopods have been used for human consumption from ancient time, and many varieties of the products were available as their traditional food. Therefore, the practical application of this "international" code with regard to "national" cephalopod processing industries, will probably require some modifications according to local conditions and specific (traditional) consumer prefereces. In other words, a "national" code of practice could be developed from the information contained in this code.

This code provides, as mentioned above, the information which covers typically standardized procedures for handling and processing of cephalopods at sea and on shore.

This code will require periodical revision, as research and experience in commercial practice bring new techniques and facilities into operation.

DRAFT CODE OF PRACTICE FOR CEPHALOPODS

Note

- The hygiene and some of the technological requirements of this code are partially based on FAO/WHO Recommended International Codes of Practice - General Principles of Food Hygiene, the Recommended International Code of Practice for Fresh Fish, the Recommended International Code of Practice for Canned Fish, the Code of Practice for Frozen Fish, the Code of Practice for Shrimp or Prawns, the Code of Practice for Lobsters and Related Species, the Code of Practice for Smoked Fish, and the Code of Practice for Crabs (See Appendix III).

- The letter and number codes given in the right hand margin indicate requirements taken from the following documents;

Recommended International Code of Practice for Fresh Fish	- FF
Recommended International Code of Practice for Canned Fish	- CF
Code of Practice for Shrimp or Prawns	- SP
Code of Practice for Lobsters and Related Species	- Lob
Code of Practice for Smoked Fish	- SMF
Code of Practice for Crabs	- Crb
Modified for the purpose of this Code	- Mod

1. SECTION I - SCOPE

This code of practice applies to fresh and processed cephalopods including commercially important cuttlefish (Sepia and Sepiella), squid (Loligo, Loliolus, Sepioteutis, Symplectoteuthis and Todarodes), and octopuses (Octopus, Polypus, and Eledone) intended for human consumption.

It contains the technological guidelines and the essential hygine requirements for harvesting, processing and handling of cephalopods at sea and on shore. The technology of canning, other than the preparation of cephalopods for canning, is not covered in this code.

2. SECTION II - DEFINITIONS

For the purpose of this code:

2.1 "autolysis" is the breakdown or deterioration of the cephalopods meat or viscera by means of indigenous enzymes; Crb 2.1/Mod

2.2 "batch systems" are those processing methods where cephalopods are processed as bulk units; Crb 2.3/Mod

2.3 "brining" means the process of placing cephalopods in a solution of food grade salt (sodium chloride) in potable water for a period of sufficient length for the cephalopod tissue to absorb a desirable quantity of salt; SMF 2.1/Mod

2.4 "chilling" is the process of cooling cephalopods to a temperature approaching that of melting ice; FF 2.4/Mod

2.5 "chilled sea water" is clean sea water reduced in temperature by addition of ice prepared from potable water or clean sea water; FF 2.5/Mod

2.6 "chlorinated water" is potable water containing about 5 ppm available chlorine;

2.7 "clean sea water" is sea water which meets the same microbiological standards as potable water and is free from objectionable substances; FF 2.6

2.8 "cleaning" means the removal of soil, food residues, dirt, grease or other objectionable matter; FF 2.7/Mod

2.9 "contamination" means direct or indirect transmission of objectionable matters to the cephalopods; FF 2.8/Mod

2.10 "cooking" means boiling of cephalopods in potable water, clean sea water or brine or heating in steam for a period of time sufficient for the thermal centre of the cephalopods to reach a temperature adequate to coagulate the protein; SP 2.7/Mod

2.11 "disinfection" means the application of hygienically satisfactory chemical or physical agents and processes to clean surfaces with the intention of eliminating micro-organisms; FF 2.9

2.12 "dry-salting" is the process of mixing cephalopods with dry food grade salt (sodium chloride) and/or sugar in such a manner that the resulting brine drains away; SMF 2.11/Mod

2.13 "enzymatic activity" is the catalytic action of enzymes on biochemical reactions; Crb 2.15

2.14 "mechanical smoking kiln or smoking tunnel" means the type of equipment in which forced flow of smoke and air passes around the cephalopods to be smoked. The required smoke is generated outside the smoking chamber; SMF 2.18/Mod

2.15 "pasteurization" means subjecting cephalopod meat to heat at times and temperatures which destroy a high proportion of objectionable micro-organisms without noticeable changes in appearance, texture and flavour of the product; SP 2.14/Mod

2.16 "plant or establishment" means the building or buildings, or parts thereof, used for, or in connection with, the manufacture or holding of food for human consumption; FF 2.17

2.17 "potable water" is fresh water fit for human consumption. Standards of potability should not be lower than those contained in the latest edition of the "International Standards for Drinking Water", World Health Organization; FF 2.18

2.18 "refrigerated sea water" is a clean sea water reduced in temperature by a suitable refrigeration system. Its salt content is normally about 3 percent; FF 2.21/Mod

2.19 "roasting" means heat processing of cephalopods by holding cooked and seasoned fillets between two heated iron plates;

2.20 "salt" means salt (sodium chloride) of an appropriate quality and otherwise suitable for the purpose; SMF 2.22

2.21 "smoke" means the volatile products derived from combustion of wood or sawdust. This term includes derivatives obtained by condensation or absorption of smoke in a suitable food grade liquid; SMF 2.23/Mod

2.22 "splitting" means cutting cephalopods along the mantle to produce a single fillet;

2.23 "suitable corrosion-resistant material" means impervious material which is free from pits, crevices and scales, is non-toxic and unaffected by sea water, ice, fish slime or any other corrosive substance with which it is likely to come in contact. Its surface must be smooth and it must be capable of withstanding exposure to repeated cleaning, including the use of detergents; FF 2.25

2.24 "traditional smoking kiln" means an enclosed space, essentially a large chimney, in which cephalopods can be subjected to the action of smoke that flows around the product by natural draught; SMF 2.26

2.25 "viscera" refers to the contents of the gut cavity of cephalopods; Crb 2.30

2.26 "waste" means those cephalopod parts which remain after the meat removal operation is completed. Crb 2.31

3. SECTION III - RAW MATERIAL REQUIREMENTS

3.1 General Considerations

3.1.1 FRESH CEPHALOPODS ARE EXTREMELY PERISHABLE, AND SHOULD BE HANDLED AT ALL TIMES WITH GREAT CARE AND IN SUCH A WAY AS TO PREVENT CONTAMINATION AND INHIBIT THE MULTIPLICATION OF MICRO-ORGANISMS FF 3.1.1/Mod

Fresh cephalopods deteriorate rapidly and their potential keeping time is shortened if they are not handled and stored properly.

Cephalopods should not be exposed to direct sunlight or to the drying effect of winds, or any other harmful effects of the elements, but should be carefully cleaned and cooled down to the temperature of melting ice, 0°C (32°F), as quickly as possible. Any careless treatments or delay in reducing the temperature of the cephalopods will have a marked effect on their potential keeping time.

3.1.2 CEPHALOPODS INTENDED FOR MARKETING AS FRESH, SHOULD BE OF THE HIGHEST POSSIBLE QUALITY FF 3.1.2/Mod

With cephalopods intended for fresh market, special care should be taken to retain their natural colour, to prevent physical damage, and to control microbiological contamination.

3.1.3 NO CEPHALOPODS OR INGREDIENTS WHICH HAVE DETERIORATED OR DECOMPOSED, OR ARE CONTAMINATED TO AN EXTENT WHICH RENDERS THEM UNFIT FOR HUMAN CONSUMPTION, SHOULD BE USED FOR THE PROCESSING OF FOOD PRODUCTS SP 3.1.2/Mod

Raw material should be rejected if it contains harmful, decomposed or extraneous substances which cannot be removed to acceptable levels by normal procedures of sorting or preparation.

Freshly caught cephalopods can easily be recognized by their appearance. The presence of lacerations, breakages and discolouration of the skin, or a yellowish tinge spreading from the liver and digestive organs inside the mantle, are the first indications of quality deterioration.

Any putrefaction or off odours can be detected by smelling. The material having any such unpleasant smell should be rejected.

3.1.4 CEPHALOPODS INTENDED FOR PROCESSINGS SHOULD RECEIVE THE SAME CARE AND ATTENTION FROM THE TIMES OF CAPTURE UNTIL THEY ARE PROCESSED AS THOSE INTENDED FOR MARKETING FRESH SMF 3.1.2/Mod

The processes and the principles involved in the preparation of cephalopods for smoking or other processings are for the most part similar to those that would be involved in preparing them for marketing as fresh. Therefore, the recommendations of the Recommended International "Code of Practice for Fresh Fish" and, where applicable, the "Code of Practice for Frozen Fish" should be used as a guide for the handling and preparation of cephalopods for processing.

HANDLING OF CEPHALOPODS AT SEA

4. SECTION IV A - FISHING VESSEL FACILITIES AND OPERATING REQUIREMENTS

4.1 General Considerations

4.1.1 THE FISHING VESSEL SHOULD BE DESIGNED FOR RAPID AND EFFICIENT HANDLING OF CEPHALOPODS, EASE OF CLEANING AND DISINFECTION, AND SHOULD BE OF SUCH MATERIAL AND CONSTRUCTION AS NOT TO CAUSE ANY DAMAGE OR CONTAMINATION OF THE CATCH FF 4.1.1/Mod

In designing a squid or cuttlefish fishing vessel, many other factors, apart from the vessel's performance as a harvesting unit, should be considered. Contamination of cephalopods with bilge water, sewage, smoke, fuel, oil, grease or other objectionable substances must be avoided. The catch should be protected against physical damage, exposure to high temperatures and drying effects of sun and wind.

All surfaces with which the cephalopods might come in contact should be of suitable corrosion-resistant material which is smooth and easily cleanable.

4.2 Vessel Construction and Sanitary Design

4.2.1 DECK POUND OR PENS STANCHIONS AND DIVIDING BOARDS AND HOLDING TANKS SHOULD BE CONSTRUCTED OF SUITABLE CORROSION-RESISTANT MATERIAL. THEY SHOULD BE ADEQUATE IN NUMBER AND HEIGHT TO PREVENT CRUSHING OF THE CEPHALOPODS DUE TO EXCESS WEIGHT OR TO THE VESSEL'S MOTION, AND TO HOLD THE ESTIMATED CATCH Lob 4.2.1/Mod

In practice, wood is still used in many fisheries for deck pound boards and steel for stanchions and other fixtures. Where this is the case, the wood should be treated to prevent the entry of moisture and should be coated with a durable non-toxic paint or other non-toxic surface coating that is smooth, readily cleanable and light colour. Steelwork should be coated with an anti-corrosion non-toxic paint. Whenever possible, suitable corrosion-resistant materials should be used.

Use of well caulked timber which is in sound condition or on an exposed deck, provided that it is thoroughly washed, is acceptable.

4.2.2 VESSEL HOLDS OR TANKS FOR STORAGE OF ICED CEPHALOPODS, SHOULD BE ADEQUATELY INSULATED WITH A SUITABLE MATERIAL. ANY PIPES, CHAINS OR CONDUITS PASSING THROUGH THE HOLD SHOULD, IF POSSIBLE, BE SUNK FLUSH OR NEATLY BOXED IN AND INSULATED — Lob 4.2.2/Mod

Adequate insulation will reduce the amount of heat entering the hold and consequently the rate of icemeltage. If the quality and structure of the insulation is poor, considerable ice meltage will take place near bulkheads and shipside.

4.2.3 HOLD OR TANK LININGS SHOULD BE COMPLETELY WATER-TIGHT. THE INSULATION LAYER SHOULD BE PROTECTED BY A LINING MADE OF CORROSION-RESISTANT METAL SHEETS OR ANY OTHER EQUALLY SUITABLE NON-TOXIC MATERIAL HAVING WATER-TIGHT JOINTS — FF 4.2.4/Mod

It is important to prevent water from carrying dirt and offal to parts of the vessel where effective cleaning is virtually impossible. The melt water, seeping through the vessel hold lining, will also reduce the efficiency of the insulation and this will, in turn, lead to an increase in the temperature of the cephalopods. The insulation should be covered with corrosion-resistant metal sheets, or any other equally suitable material having water-tight joints to ensure protection from such contamination. An effective drainage system should be able to remove the melt water into a sump as fast as it accumulates.

4.2.4 WOODEN HOLDS OR WOODEN HOLDING TANKS SHOULD BE LINED WITH A SUITABLE MATERIAL — FF 4.2.5/Mod

The linings of wooden holds or tanks should be similar to those described above. They should be sealed and coated with a suitable impervious and non-toxic material which is easy to keep clean and not difficult to repair.

4.2.5 THERE SHOULD BE NO SHARP CORNERS OR PROJECTIONS IN THE HOLD OR TANK AS THESE WILL MAKE CLEANING DIFFICULT AND MAY DAMAGE THE CEPHALOPODS — FF 4.2.14/Mod

Contamination with dirt and offal will build up rapidly on surfaces, in conrners or around projections which are not smooth and impervious.

Any ledges or projections resulting from the encasement of pipes, wires, chains and conduits, that are passing through the vessel hold, should be so constructed as to allow free drainage, ease of cleaning and not to cause any physical damage to the cephalopods.

4.2.6 PORTABLE BOARDS OF SUITABLE CORROSION-RESISTANT MATERIAL OR IMPREGNATED AND PAINTED WOOD, SHOULD BE USED FOR MAKING SHELVES AND VERTICAL DIVISIONS IN THE HOLDS — FF 4.2.6/Mod

The use of portable boards, which are a good fit in the stanchions, allows the shelf and dividing structure to be dismantled and removed for cleaning. Wooden boards should be treated to prevent the entry of moisture and should be coated with durable non-toxic paint or other equally suitable surface coating that is smooth, readily cleanable and repairable. Wherever possible, the shelving and the partitioning boards should be interchangeable in size.

4.2.7 SHELVING BOARDS SHOULD BE DESIGNED TO ALLOW ADEQUATE DRAINAGE FF 4.2.7

A continuous trickle of melt water will help to carry away slime and micro-organisms which should not be allowed to collect on the shelves. Corrugated boards of corrosion-resistant material are most suitable for this purpose.

4.2.8 THERE SHOULD ALWAYS BE AMPLE DRAINAGE SPACE BETWEEN THE LOWEST SHELVES OR THE "FALSE BOTTOM" AND THE FLOOR OF THE HOLD. THIS SPACE SHOULD BE OPEN TO A CENTRAL DRAIN, DISCHARGING DIRECTLY INTO ONE OR MORE SUMPS OR WELLS, LOCATED SO THAT THE HOLD CAN BE EFFICIENTLY DRAINED AT ALL TIMES. BILGE PUMP CONNECTIONS TO THESE SUMPS SHOULD BE FITTED WITH COARSE SCREEN FILTERS FF 4.2.9/Mod

Proper drainage facilities can prevent a build-up of large quantities of melt water, dirt and offal. If drainage is inadequate, the bottom layers of the cephalopods in the hold may be contaminated by this dirty liquid, especially during the periods of severe motion of the vessel.

4.3 Sanitary Facilities

4.3.1 DECK HOSES SHOULD BE SUPPLIED WITH CLEAN SEA WATER, AT ADEQUATE PRESSURE, BY A PUMP USED ONLY FOR CLEAN SEA WATER FF 4.3.4/Mod

A good supply of clean sea water, at adequate pressure, with an addition of chlorine, if possible, should be available.

The intake for sea water should be well forward of and on the opposite side of the vessel from the toilet, waste and engine cooling discharge. Sea water should not be used while the vessel is in harbour or in areas where there is a danger of it being polluted. Clean sea water should be taken in while the vessel is in forward motion.

The piping for the clean sea water supply should have no cross connections with the engine or condenser cooling system. It should be so constructed as to prevent any possibility of back-syphonage from the kitchen sink or toilets.

4.3.2 ICE SHOULD BE MADE FROM POTABLE WATER OR CLEAN SEA WATER AND SHOULD NOT BE CONTAMINATED WHEN MANUFACTURED, HANDLED OR STORED FF 4.3.5/Mod

Ice made from water which is neither potable nor clean sea water, may contaminate the cephalopods with water-borne micro-organisms or other objectionable or even harmful substances. Such contamination will result in the loss of quality, reduced keeping time and may create a health hazard.

When vessels are taking ice to sea, only fresh clean ice should be taken on board at the beginning of each voyage. Ice storage on board should be in an insulated hold and all unused ice should be discarded at the end of the trip.

4.3.3 THE VESSEL'S TOILET FACILITIES AND ALL PLUMBING AND WASTE DISPOSAL LINES SHOULD BE SO CONSTRUCTED AS NOT TO CONTAMINATE THE CATCH FF 4.3.7/Mod

All the plumbing and waste disposal lines servicing the vessel's toilets, hand wash basins or kitchen sinks, should be large enough to carry peak loads, be watertight and should not go through the holds where cephalopods are being handled or stored.

4.3.4 IF POISONOUS AND HARMFUL MATERIALS, INCLUDING CLEANING COMPOUNDS, DISINFECTING MATERIALS AND PESTICIDES, ARE STORED ON BOARD THE VESSEL, THEY SHOULD BE KEPT IN A SEPARATE COMPARTMENT RESERVED AND MARKED SPECIFICALLY FOR THIS PURPOSE FF 4.3.11/Mod

Extreme caution must be exercised to prevent poisonous or harmful materials from contaminating the cephalopods. All such materials should be prominently and distinctly labelled so that there can be no confusion between these and edible materials used aboard the vessel. Such compartments should be kept locked and the materials contained in them should be handled only by personnel trained in their use.

4.3.5 THE FISHING VESSEL SHOULD BE EQUIPPED WITH BRUSHES, SCRAPERS, WATER HOSES, SPRAY NOZZELS AND OTHER SUITABLE WASHING AND DISINFECTING EQUIPMENT FF 4.3.10

Although there is a variety of cleaning and disinfecting equipment available on the market, good quality hand brushes, of several sizes and shapes, are still the most inexpensive and versatile tools for cleaning operations. Brushes should be kept in a clean and sound condition, disinfected after each use (dipping in 50 ppm chlorine solution is recommended) and when not used, should be stored in a dry state. Unclean brushes could spread dirt and micro-organisms. Micro-organisms may proliferate in a dirty brush when stored in a wet condition. The use of steel wool for scouring should be avoided as there is a constant danger of introducing small, sometimes hardly visible, bits of wire into the final product. If for some reason cleaning cannot be done effectively with a good brush, then plastic, brightly coloured scouring pads might be used.

The high pressure and high frequency oscillating water or detergent-spraying equipment has been found to be quite effective in cleaning, but it usually requires an experienced operator to prevent damage to painted surfaces.

4.4 Equipment and Utensils

4.4.1 ALL CONTAINERS USED FOR ICE STOWING OF CEPHALOPODS, SHOULD BE OF UNIFORM AND SUITABLE SIZE, EASY TO HANDLE WHEN LOADED, AND SHOULD BE CONSTRUCTED OF SUITABLE CORROSION-RESISTANT MATERIAL FF 4.4.6/Mod

Such containers, when fully loaded, should be easy to handle by one or two men without tilting, tipping or jerking.

If wooden boxes are used, they should be of a smooth construction and of durable, non-toxic and waterproof finish or should be new.

Baskets should not be used for handling cephalopods on board the vessel or on shore, as they are difficult to clean and disinfect.

4.4.2 ALL EQUIPMENT USED IN FREEZING AND FROZEN STORAGE OF CEPHALOPODS ABOARD THE VESSEL SHOULD MEET THE REQUIREMENTS OF THE RECOMMENDED INTERNATIONAL "CODE OF PRACTICE FOR FROZEN FISH"

Most of the recommendations made in that code would apply equally to freezing and frozen storage of cephalopods.

4.5 Hygienic Operating Requirements

4.5.1 ALL TUBS, TANKS, BARRELS AND OTHER EQUIPMENT USED IN HANDLING, WASHING AND CONVEYING OPERATIONS SHOULD BE THOROUGHLY CLEANED, DISINFECTED AND RINSED AFTER EACH CYCLE OF USE FF 4.5.2/Mod

Any dirt or offal if allowed to dry and accumulate on surfaces with which cephalopods come in contact, will be very difficult to remove later and will thus contaminate the subsequent loads of cephalopods.

4.5.2 DURING FISHING TRIPS THE VESSEL'S HOLD AND BILGE SUMP SHOULD BE DRAINED REGULARLY. THE SUMP SHOULD BE ACCESSIBLE AT ALL TIMES FF 4.5.3/Mod

Bilge water containing dirt and offal, if not regularly pumped out, will provide a medium for the multiplication of micro-organisms and give rise to offensive odours in the hold.

4.5.3 ADEQUATE PRECAUTIONS SHOULD BE TAKEN TO ENSURE THAT HUMAN AND OTHER WASTES FROM THE FISHING VESSEL ARE DISPOSED OF IN SUCH A MANNER AS NOT TO CONSTITUTE A PUBLIC HEALTH AND HYGIENE HAZARD FF 4.5.12

With man's increased concern for the protection of his environment, in some countries the disposal of any waste from any boat into the surrounding water is restricted by law.

The fishermen should be fully aware of their responsibilities in this regard. Discharge of animal, human or any other wastes from the fishing vessel into the sheltered waters close to man-inhabited areas, or over the shellfish growing areas, should not be practised.

4.5.4 SEA WATER WHICH HAS BEEN USED FOR COOLING ENGINES, CONDENSERS OR SIMILAR EQUIPMENT SHOULD NOT BE USED FOR WASHING CEPHALOPODS, DECK, HOLD OR ANY OTHER EQUIPMENT WHICH MIGHT COME IN CONTACT WITH CEPHALOPODS FF 4.5.5/Mod

The water used for cooling engines is usually at a higher temperature than fresh sea water and might be contaminated with oil or other petroleum products or contain rust and other by-products of metal corrosion.

Such water, therefore, will considerably accelerate spoilage of cephalopods by raising the temperature and might impart objectionable taste, odour or undesirable discolouration.

4.5.5 WHEN CLEANING AND HOSING OPERATIONS ARE CARRIED OUT, WHILE THE VESSEL IS IN PORT, POTABLE WATER OR CLEAN SEA WATER SHOULD BE USED FF 4.5.6/Mod

Harbour water is usually heavily polluted and should never be used for cleaning purposes. This is also true for sea water in the close vicinity of towns, villages, industrial plants, fish processing establishments and factory ships.

4.5.6 IMMEDIATELY AFTER THE CATCH IS UNLOADED THE DECK AND ALL DECK EQUIPMENT SHOULD BE HOSED DOWN, BRUSHED, THOROUGHLY CLEANED WITH A SUITABLE CLEANING AGENT, DISINFECTED AND RINSED — FF 4.5.7/Mod

Guts, slime and other residue left on the deck will support multiplication of micro-organisms which may contaminate future catches. If allowed to dry, dirt and offal are very difficult to remove.

Thorough cleaning should always precede disinfection, especially when chlorine is used as the disinfecting agent. Any organic matter which is not removed from the surfaces that are to be disinfected, will rapidly combine with and neutralize the micro-organism killing ability of chlorine or any other disinfectant.

4.5.7 AT THE END OF EACH TRIP ANY UNUSED ICE SHOULD BE DISCARDED — SP 4.3.13

Despite all precautions, unused ice in the hold will become contaminated and will contaminate the new catch.

4.5.8 IMMEDIATELY AFTER THE CATCH IS LANDED THE HOLD AND BILGE SUMP SHOULD ALSO BE EMPTIED COMPLETELY. ALL SURFACES IN THE HOLD, POUND BOARDS AND SUMP SHOULD BE THOROUGHLY CLEANED WITH A SUITABLE CLEANING AGENT, DISINFECTED AND RINSED — FF 4.5.8/Mod

This is necessary to remove all dirt, offal and other residue as soon as the catch is landed, in order to avoid multiplication of micro-organisms, offensive odours and the drying of residues on the hold or other surfaces. Cleaning should be completed before fresh ice is taken on board for the next trip.

4.5.9 CLEANING, WASHING AND DISINFECTING PROCEDURES SHOULD BE EFFECTIVE — SP 4.3.15/Mod

Detergents and disinfectants should conform to public health requirements and should not be allowed to come into contact with cephalopods. Any residue of cleaning agents used for washing of boats and the equipment, should be removed by thorough rinsing with potable fresh or clean sea water before the area or equipment is used again for stowing or handling cephalopods.

In choosing and applying different detergents, sanitizers and disinfectants, one should be fully aware of their properties and limitations. Many agents are effective only when prepared and used in strict accordance with the manufacturer's recommendations.

Temperature of the solution, its acidity or alkalinity concentration of the active ingredient, presence of other chemicals, kind of surface to be treated or type of soil (dirt) and mode of application, are some of the factors that will determine the usefulness of the agent. Different agents should not be combined since one agent may neutralize the activity of another.

4.5.10 EMPTY VESSEL HOLDS OR STORAGE TANKS SHOULD BE VENTILATED — SP 4.3.16/Mod

Strong odours associated with mildew, stagnant humid air and decomposing organic matter will develop in the absence of ventilation. All the containers, pails, boxes and tubs, after washing and sanitizing should be stacked in such a way as to permit sufficient aeration.

4.5.11 EFFECTIVE MEASURES SHOULD BE TAKEN TO PROTECT THE FISHING VESSEL AGAINST INSECTS, RODENTS, BIRDS OR OTHER VERMIN FF 4.5.13/Mod

Rodents, birds and insects are potential carriers of many diseases which could be transmitted to many by contamination of the catch. Fishing vessels should be regularly examined for evidence of infestation and, when required, effective control measures should be taken.

All rodenticides, fumigants, insecticides and other harmful substances should be used only in accordance with the recommendations of the appropriate official agency having jurisdiction.

4.5.12 DOGS, CATS AND OTHER ANIMALS SHOULD BE EXCLUDED FROM AREAS OF THE VESSEL WHERE CEPHALOPODS ARE RECEIVED, HANDLED, PROCESSED AND STORED FF 4.5.14/Mod

Because of public health hazards and for aesthetic reasons, no surface of the fishing vessel and of the equipment thereon which comes in contact with cephalopods, should be exposed to contamination with animal hair or excreta.

4.6 Handling and Processing of Cephalopods at Sea

4.6.1 General Considerations

4.6.1.1 DURATION OF THE TRIP FOR A CEPHALOPOD HARVESTING VESSEL SHOULD BE DETERMINED BY THE FACILITIES AVAILABLE ON THE VESSEL FOR HANDLING AND KEEPING THE CATCH WELL CHILLED OR FROZEN, DISTANCE FROM THE PROCESSING PLANTS OR MARKETS AND THE LOCAL ENVIRONMENTAL CONDITIONS

From the time the cephalopods are caught, there is a continual and irreversible deterioration in quality. The progress and degree of such deterioration are governed mainly by the time the cephalopods are held and the temperatures at which they are handled and stored on board the harvesting vessel. With short distances from the processing plant and market, more time might be spent on the fishing grounds, providing the boat is equipped with adequate facilities to handle, effectively chill and hold the catch at low temperature. With more distant fishing grounds proper freezing and freezer **store facilities should be provided.**

4.6.2 Handling the Catch on Board

4.6.2.1 PROPER HANDLING OF CEPHALOPODS AT SEA SHOULD ENSURE THAT THE CATCH RETAINS ITS INITIAL FRESHNESS UNTIL LANDING

The freshness of caught cephalopods depends mainly on temperature and time of storage and cleanliness of immediate environment. The temperature is the most important single factor influencing the keeping quality of fresh cephalopods. The effects of increasing temperature are cumulative; that is, some potential keeping time is lost each time the temperature of the cephalopods rises. The extent of this loss depends both on the degree of the rise and the length of time the cephalopods remain at the higher temperature. It is therefore important to chill the catch quickly to the temperature of melting ice and maintain it in a chilled condition until it reaches the processor or the market. Also, it is essential to maintain a high standard of cleanliness on deck, inside the holds and processing areas.

4.6.2.2 IMMEDIATELY AFTER THE CEPHALOPODS ARE CAUGHT THEY SHOULD BE TRANSFERRED RAPIDLY FROM HARVESTING MACHINE TO HOLDS OR WORKING AREA

For efficient and rapid transfer of the cephalopods from the deck to holds or working area a properly designed transfer system should be used. In the case of squid jigging vessels, an open flume, adequately sloped, should be provided along the harvesting machines. The cephalopods are dropped into the flume and are carried away toward the hatches of working areas by a stream of clean sea water (see Appendix I "General Deck Layout of Squid Jigging Vessel").

4.6.2.3 THE CEPHALOPODS WHICH ARE TO BE TRANSFERRED TO THE PROCESSING HALL SHOULD BE CHILLED RAPIDLY IN MELTING ICE OR IN CHILLED SEA WATER OR REFRIGERATED SEA WATER AND SHOULD BE STORED SO THAT THE TEMPERATURE DOES NOT RISE

Cooling with ice should preferably be preceded by cooling in chilled sea water where direct and rapid heat removal takes place. Iced cephalopods are commonly stored in plastic or steel boxes. The amount of ice required to ensure adequate protection for three days storage depends on the ambient temperature. The amount of ice used should be adequate to chill and maintain cephalopods temperature at about 0°C (32°F).

Rapid chilling takes place only when the ice is melting and the resulting ice-cold melt water perculates downward through the layers of cephalopods. When the ice stops melting because of low temperature, its effectiveness as a cooling agent diminishes considerably.

If cephalopods are to be processed at sea they should be chilled immediately after they are caught and kept throughout chilled until the processing commences. The deteriorating effects of increased temperature are cumulative and cannot be reversed by further processing.

4.6.2.4 CEPHALOPODS IN ICE SHOULD BE STOWED IN SHALLOW LAYERS **SP 4.4.3.2/Mod**

In bulk stowing the cephalopods should be well mixed with finely divided ice or iced in layers which are not excessive in depth. Adequately shelved holds, or pends, or proper containers should be used for this purpose. Chilling of cephalopods in bulk by top icing only should be avoided.

4.6.2.5 FINELY DIVIDED ICE SHOULD ALWAYS BE USED **SP 4.4.3.4/Mod**

This gives close contact with the cephalopods, reduces damage by crushing and gives rapid cooling.

4.6.2.6 WHERE BOXES ARE USED FOR STOWING CEPHALOPODS THEY SHOULD BE PROPERLY ICED AND NOT OVERFILLED **SP 4.4.3.5/Mod**

It is an advantage to pack cephalopods with ice into boxes at sea. The cephalopods, if adequately iced, can remain undisturbed in the boxes until they reach the processor or the market. Unloading the catch can be simpler and, if required, more ice can be added to the boxes on landing without disturbing the cephalopods.

Each day's catch can also be separated more easily. Since boxes are stacked one on top of another in the hold, overfilling will result in damage to the cephalopods. For efficient cooling each box should contain a layer of ice on the bottom, then cephalopods and ice mixed together, and lastly a top layer of ice.

4.6.2.7 WHERE APPROPRIATE, A STOWAGE PLAN SHOULD BE KEPT ON ANY VESSEL FISHING FOR MORE THAN A DAY OR TWO FF 4.6.27/Mod

A well prepared stowage plan enables the various day's catches to be kept separate when unloading. Cephalopods from different days' catches should never be mixed together when stowed.

4.6.2.8 FOR RAPID CHILLING OF CEPHALOPODS THE USE OF CHILLED OR REFRIGERATED SEA WATER IS RECOMMENDED

Both methods, if properly used, will assure the most thorough and rapid heat removal. It has been suggested that the storage in ice should preferably be preceded by cooling in chilled or refrigerated sea water. For ice storage, the chilling takes place only when the ice is melting and the resulting ice-cold melt water perculates downward through the layers of cephalopods.

When the ice stops melting its effectiveness as a cooling agent deminishes considerably. This will not occur if the cephalopods are stored in either chilled or RSW, where the low temperature of water is constantly maintained.

In certain countries the use of chilled or refrigerated sea water has been practised extensively and with excellent results.

4.6.3 Processing the Catch on Board

4.6.3.1 GUTTING OF CEPHALOPODS SHOULD BE CARRIED OUT UNDER CONTINUOUS SUPPLY OF CLEAN SEA WATER TO CARRY THE VISCERAL CONTENT OVER THE SHIPSIDE OR TO A SUITABLE CONTAINER

4.6.3.2 CHLORINATED WATER SHOULD BE USED FOR PROCESSING OF CEPHALOPODS

The use of chlorinated water during the processing helps to check the multiplication of micro-organisms on working surfaces of equipment and on the surface areas of the product.

The cephalopods which are intended for skinning, removal of tentacles, heads, viscera, deboning or trimming, should be thoroughly washed with clean sea or potable water containing about 5 ppm available chlorine.

After processing the fillets from cuttlefish and tubes from squids should be washed again in chilled/refrigerated sea water or potable water of the same chlorine level.

After careful evisceration and the removal of the eyes and the beak the meat should be thoroughly washed in running clean sea water. The visceral content of cephalopods is highly proteolytic, containing large concentration of digestive enzymes and spoilage micro-organisms, which if not removed rapidly and thoroughly, will result in marked deterioration of quality.

In disposing of offal into the surrounding water, some consideration should be given to the possibility of a serious pollution problem, especially if this is done in sheltered waters, close to public beaches or inhabited areas.

4.6.3.3 AS THE PROCESSING PROGRESSES THROUGH VARIOUS STAGES, CARE SHOULD BE TAKEN TO PREVENT ANY WARMING UP OF THE CEPHALOPOD MEAT

After completion of each stage of processing, it is strongly recommended to keep the material constantly chilled either by ice or by immersion in clean ice water.

4.6.3.4 CLEAN CHILLED BRINE OR REFRIGERATED SEA WATER SHOULD BE USED TO FIRM UP THE TEXTURE OF THE CEPHALOPOD MEAT

The original flesh texture of the meat could be regained by having them immersed in either one percent salt solution in ice potable water or in clean chilled or refrigerated sea water.

Approximately 15 to 20 minutes exposure to this level of salinity should be sufficient. The adequacy of treatment, could be easily ascertained by compressing the meat in between two fingers and comparing its texture with a freshly cut cephalopod fillet.

4.6.3.5 THE MATERIAL TREATED WITH SALT WATER SHOULD BE WASHED AGAIN IN CLEAN ICE WATER

Once the salt water treatment is completed, the material should be rinsed in clean ice water to excess salt that might have been absorbed. This procedure should be completed as quickly as possible, otherwise softening of texture will occur again.

4.6.4 Freezing and Freezer Storage

4.6.4.1 THE CEPHALOPODS SHOULD BE FROZEN ON BOARD THE VESSEL IF THE FISHING OPERATIONS LAST LONGER THAN THREE DAYS

Any prolonged holding of raw cephalopods, even at temperatures approaching that of melting ice, results in gradual deterioration of quality. For the fishing operations lasting longer than three days, the cephalopods should be frozen, glazed and stored at -20°C (-4°F) to -25°C (-13°F).

4.6.4.2 FREEZING AND FROZEN STORAGE ON BOARD VESSELS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE RECOMMENDED INTERNATIONAL "CODE OF PRACTICE FOR FROZEN FISH" Lob 4.6.2.7/Mod

The hygienic requirements on board vessels should be just as high as those required in shore processing plants. Although the Recommended International "Code of Practice for Frozen Fish" does not deal specifically with the freezing of cephalopods, most of the recommendations made would apply.

4.6.4.3 ONLY THE HIGHEST QUALITY CEPHALOPODS SHOULD BE USED FOR FREEZING WHOLE

Segregation should be made on the basis of species, colour, size and absence of visible physical damage. Such cephalopods should be thoroughly washed and the openings of ink sacks should be closed by a string or a plastic clip.

Immediately after the washing and segregation and prior to freezing, they should be well prechilled in clean ice water or refrigerated sea water. Time of prechilling and the presence of certain salts in the water might affect the texture and the colour.

4.6.4.4 FREEZING SHOULD BE RAPID TO ELIMINATE OR DEMINISH QUALITY DETERIORATION

The cephalopods should be rapidly frozen to ensure a high quality product. It is known that the cephalopods can suffer detrimental changes, including protein denaturation and cell damage when exposed to a very slow or incomplete freezing. The quality losses can seriously affect the texture, flavour and keeping time of the products.

4.6.4.5 FREEZING SHOULD BE COMPLETED IN THE FREEZER AND SHOULD NEVER BE CARRIED OUT BY PLACING UNFROZEN OR PARTIALLY FROZEN PRODUCTS IN A FREEZER STORE

Freezing of cephalopods should be completed in a blast or contact freezer before they are moved to a freezer store. Refrigeration equipment in freezer stores usually does not have sufficient capacity to take care effectively of additional heat load. Warm products placed in a freezer store will not only take a very long time to freeze, but may also warm up other products already in the store.

4.6.4.6 PRECISE FREEZING TIMES FOR CEPHALOPODS SHOULD BE CAREFULLY DETERMINED

The freezing time required is influenced by many variables, such as product shape, size, the area exposed to the refrigerated surface and the temperature of the refrigerant. The exact freezing time should be determined by direct measurements of the product temperatures during the freezing process. In many countries, practical advice on how to freeze the cephalopods and how to measure product temperature adequately, can be obtained from fishery research organizations.

4.6.4.7 ACCURATE RECORDS SHOULD BE KEPT OF ALL FREEZING OPERATIONS

An accurate record of all loading and unloading times of the freezer, type and the size of the product and any other relevant information, will greatly assist in the efficient management and control of the operation.

4.6.4.8 FROZEN CEPHALOPODS SHOULD BE PROTECTED FROM DEHYDRATION AND OXIDATION IN THE FREEZER STORE E.G. BY GLAZING AND WRAPPING IMMEDIATELY AFTER FREEZING

The cephalopods frozen in blocks or individually quick frozen are usually glazed or packed in wrappers or cartons to protect them from dehydration and oxidation and also to safeguard their hygienic condition.

Food additives cannot be used indiscriminately in ice glazing. Food laws differ from one country to another and it is essential to seek advice of a specialist in this field before an additive is used.

4.6.4.9 A STOWAGE PLAN OF THE FREEZER STORE SHOULD BE KEPT TO FACILITATE LOCATING PRODUCTS OF DIFFERENT SPECIES, SIZE AND RAW MATERIAL CONDITION

A well prepared stowage plan will assist, during unloading, in separating lots of different species, size, stage of processing, level in quality and intended for different purposes.

4.7 Unloading and Transport of the Catch

4.7.1 SUITABLE LANDING AREAS SHOULD BE PROVIDED — Lob 4.7.1

Landing directly onto beaches or uncontrolled areas can lead to contamination. Provision of a wharf, quay or pier is most desirable.

4.7.2 LANDING AREAS SHOULD BE KEPT CLEAN — Lob 4.7.2

Refuelling and handling of fuel, lubricants and other material which might contaminate the catch, should be done in areas separate from those where the catch is unloaded. It should be the specific responsibility of an individual to keep the unloading areas clean.

4.7.3 UNLOADING FACILITIES SHOULD EITHER BE PROVIDED ON THE WHARF OR INCORPORATED ON THE VESSEL — Lob 4.7.3/Mod

Such facilities should enable the catch to be transferred to the wharf rapidly without causing damage and in a manner that will not lead to contamination.

4.7.4 CONTAINERS USED FOR UNLOADING SHOULD BE CONSTRUCTED OF SUITABLE CORROSION-RESISTANT MATERIAL. THEY SHOULD BE CLEAN TO AVOID CONTAMINATION AND STRONG ENOUGH TO PREVENT PHYSICAL DAMAGE TO THE CEPHALOPODS DURING TRANSIT. WICKER BASKETS AND WOODEN BOXES SHOULD NOT BE USED — Lob 4.7.4/Mod

Care should be taken not to damage the cephalopods during unloading, or removal from the container. If cephalopods are iced in boxes, the boxes should be large enough to hold sufficient ice.

4.7.5 CEPHALOPODS AFTER UNLOADING SHOULD BE TRANSFERRED WITHOUT DELAY INTO TRANSPORT VEHICLES — Crb 4.7.6/Mod

Landings will either be direct to a processing plant or some transport by truck, rail or air will be necessary.

4.7.6 SURFACE TRANSPORT VEHICLES SHOULD BE INSULATED OR PREFERABLY REFRIGERATED TO KEEP CEPHALOPODS COOL — Crb 4.7.7/Mod

Cephalopods iced at sea should be carried as close to melting ice temperature as may be practicable and re-iced as necessary. Cephalopods frozen at sea should not be allowed to thaw out in transit. The temperature should be maintained as close to the freezer store temperature as possible and should not exceed -18°C (0°F).

4.8 Hygiene Control Programme

4.8.1 IT IS DESIRABLE THAT EACH FISHING VESSEL SHOULD DEVELOP ITS OWN SANITARY CONTROL PROGRAMME BY INVOLVING THE WHOLE CREW AND BY ASSIGNING TO EACH MEMBER A DEFINITE TASK IN CLEANING AND DISINFECTING THE BOAT — FF 4.8/Mod

A permanent cleaning and disinfecting schedule should be drawn up to ensure that all parts of the boat and equipment thereon are cleaned appropriately and regularly.

The fishermen should be well trained in the use of special cleaning tools; methods of dismantling equipment for cleaning and should be knowledgeable in the significance of contamination and the hazards involved.

HANDLING OF CEPHALOPODS ON SHORE

5. SECTION IV B - PLANT FACILITIES AND OPERATING REQUIREMENTS

5.1 Plant Construction and Layout

5.1.1 General Considerations

5.1.1.1 CEPHALOPOD PROCESSING PLANTS SHOULD BE DESIGNED AND EQUIPPED SO THAT ALL HANDLING AND PROCESSING OPERATIONS CAN BE CARRIED OUT EFFICIENTLY, AND ALL MATERIALS AND PRODUCTS CAN PASS FROM ONE STAGE OF PROCESSING TO THE NEXT IN AN ORDERLY MANNER AND WITH MINIMUM DELAY — SMF 4.1.1.1/Mod

A great deal of care should be taken in planning the layout and equipment of a cephalopod processing plant to ensure that there is sufficient space and suitable facilities to carry out each operation efficiently with due concern for hygiene and quality of the final product and to move cephalopods and materials through the various stages in an orderly manner.

In order to prevent cross-contamination between different processing activities and safeguard the wholesomeness and quality of products, the following operations should be conducted in separate rooms or in well defined areas of adequate size.

(a) receiving and storage of raw materials;
(b) processing (dressing, skinning, dry-salting);
(c) roasting or smoking or splitting, seasoning;
(d) cooling, packaging, and
(e) storage of final products.

The handling of cephalopods and storage areas should be entirely divorced from:

(f) storage of waste materials;
(g) storage of packaging materials;
(h) storage of cleaning and disinfecting compounds, and
(i) storage of wood and wood products used in the smoking process.

Rooms or areas where dripping and drying of cephalopods prior to smoking or cooling of products after the smoking are carried out should comply with all building and sanitary requirements stated for other handling and processing areas. Adequate chill room facilities should be provided for dry-salting prior to smoking and after skinning, if the ambient temperature necessitates it.

5.1.1.2 CEPHALOPODS PROCESSING PLANTS SHOULD BE SPECIALLY DESIGNED FOR THE PURPOSE SP 5.1.1.1/Mod

Meat of cephalopods spoils even more rapidly than fish. It is therefore essential that the processing is carried out rapidly in a plant designed to handle cephalopods and that no build-up of part-processed products occurs.

5.1.2 Plant Construction and Sanitary Design

5.1.2.1 THE PLANT AND SURROUNDING AREA SHOULD BE SUCH AS CAN BE KEPT REASONABLY FREE FROM OBJECTIONABLE ODOURS, SMOKE, DUST OR OTHER CONTAMINATION. THE BUILDINGS SHOULD BE SUFFICIENT IN SIZE WITHOUT CROWDING OF EQUIPMENT OR PERSONNEL, WELL CONSTRUCTED AND KEPT IN GOOD REPAIR. THEY SHOULD BE DESIGNED AND CONSTRUCTED TO PROTECT AGAINST THE ENTRANCE AND HARBOURING OF INSECTS, BIRDS OR OTHER VERMIN, AND TO PERMIT READY AND ADEQUATE CLEANING SP 5.1.2.1/Mod

The location of a processing plant, its design, layout, construction and equipment should be planned in detail with considerable emphasis on the hygienic aspect, sanitary facilities and quality control.

Where new premises are constructed, or when existing buildings are modified, national or local authorities should always be consulted in regard to building codes, hygienic requirements of the operation and sanitary disposal of sewage and plant waste.

Prior to the construction of a new plant or modification of the existing one, a proper flow pattern of operation should be considered (see Appendix II, "Flow Diagram for Handling and Processing of Cephalopods"). Only a well-organized work flow could assure the maximum efficiency of the operation and the better quality product.

The food handling area should be completely separate from any part of the premises used as living quarters.

5.1.2.2 FLOORS SHOULD BE HARD SURFACED, NON-ABSORBENT AND ADEQUATELY DRAINED FF 5.1.2.2

Floors should be constructed of durable, waterproof, non-toxic, non-absorbent material which is easy to clean and disinfect. They should be non-slip and without crevices and should slope evenly and sufficiently for liquids to drain to trapped outlets fitted with a removable grill.

If floors are ribbed or grooved to facilitate traction, any grooving of this nature should always run toward the drainage channel.

The junctions between the floors and walls should be impervious to water and should be coved or rounded for ease of cleaning.

Concrete, if not properly finished, is porous and can be affected by animal oils, strong brines, various detergents and disinfectants. If used, it should be dense, of a good quality, and with a well finished waterproof surface.

5.1.2.3 DRAINS SHOULD BE OF AN ADEQUATE SIZE, SUITABLE TYPE, EQUIPPED WITH TRAPS AND WITH REMOVABLE GRATINGS TO PERMIT CLEANING FF 5.1.2.3

Suitable and adequate drainage facilities are essential for removal of liquid or semi-liquid wastes from the plant. There should be no floor area where water might collect in stagnant pools. Drains should be constructed of smooth and impervious material and should be designed to cope with the maximum flow of liquid without any overflowing and flooding. Each drainage inlet should be provided with a deep seal trap which is appropriately located and easy to clean.

Drainage lines carrying waste effluent, except for open drains, should be properly vented, have a minimum internal diameter of 10 cm (4 in) and, if required, run to a catch basin for removal of solid waste material. Such a basin should be located outside the processing area and should be constructed of waterproof concrete or other similar material designed to the local specifications and approved by the local authorities having jurisdiction.

5.1.2.4 INTERNAL WALLS SHOULD BE SMOOTH, WATERPROOF, RESISTANT TO FRACTURE, LIGHT COLOURED AND READILY CLEANABLE FF 5.1.2.4

Acceptable materials for finishing walls inside are cement render, ceramic tiles, various kinds of corrosion-resistant metallic sheeting, such as stainless steel or aluminium alloys, and a variety of non-metallic sheeting which have adequate impact resistance, desirable surface qualities and are easily repairable.

All sheeting joints should be sealed with a mastic or other compound resistant to hot water and cover strips should be applied where necessary.

Wall-to-wall and wall-to-floor junctions should be coved or rounded to facilitate cleaning.

Walls should be free from projections and all pipes and cables should be sunk flush with the wall surface or neatly boxed in.

5.1.2.5 WINDOW SILLS SHOULD BE KEPT TO A MINIMUM SIZE, BE SLOPED INWARD AT 45° AND BE AT LEAST 1 METRE FROM THE FLOOR — FF 5.1.2.5

Window sills and frames should be made of a smooth, waterproof material and, if of wood, should be kept well painted. Internal window sills should be sloped to prevent storage of miscellaneous materials or accumulation of dust and should be constructed to facilitate cleaning.

Windows should be filled with whole panes and those which open should be screened. The screens should be constructed so as to be easily removable for cleaning and should be made from suitable corrosion-resistant material.

5.1.2.6 ALL DOORS THROUGH WHICH CEPHALOPODS OR THEIR PRODUCTS ARE MOVED SHOULD BE SUFFICIENTLY WIDE, WELL CONSTRUCTED OF A SUITABLE MATERIAL AND SHOULD BE OF A SELF-CLOSING TYPE — FF 5.1.2.6/Mod

Doors through which cephalopods or their products are moved, should be either sheathed with or made of corrosion-resistant metal or other suitable material with adequate impact resistance and, unless provided with an effective air screen, should be of a self-closing type.

Both the doors and the frames of the doorways should have a smooth and readily cleanable surface.

Doors through which the product is not moved, such as those providing staff access, should be appropriately surfaced, at least on the processing area side, to allow for ease of cleaning.

5.1.2.7 CEILINGS SHOULD BE DESIGNED AND CONSTRUCTED TO PREVENT ACCUMULATION OF DIRT AND CONDENSATION AND SHOULD BE EASY TO CLEAN — FF 5.1.2.7/Mod

Ceilings should be preferably a minimum of 3 m from the floor in height, free from cracks and open joints and should be of a smooth, waterproof, light coloured finish, which does not permit the growth of mould.

In buildings where beams, trusses, pipes or other structural elements are exposed, the fitting of a suspended ceiling just below is desirable.

Where the roof beams and trusses cannot be covered, the underside of the roof may constitute a satisfactory ceiling providing all joints are sealed and the supporting structures are of a smooth, well painted and light coloured surface, easily cleanable and constructed to protect the cephalopod products from falling debris, dust or condensate.

5.1.2.8 PREMISES SHOULD BE WELL VENTILATED TO PREVENT EXCESSIVE HEAT, CONDENSATION AND CONTAMINATION WITH OBNOXIOUS ODOURS, DUST, VAPOUR OR SMOKE — FF 5.1.2.8

Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes, vapours or contaminating aerosols. The air-flow in the premises should be from the more hygienic areas to the less hygienic areas. Good ventilation is important to prevent condensation and growth of moulds in overhead structures. Ventilation openings should be screened and, if

required, equipped with proper air filters. Windows which open for ventilation purposes should be screened. The screens should be made easily removable for cleaning and should be made from suitable corrosion-resistant material.

5.1.2.9 A MINIMUM ILLUMINATION OF 220 LUX (20 FOOT CANDLES) IN GENERAL WORKING AREAS AND NOT LESS THAN 540 LUX (50 FOOT CANDLES) AT POINTS REQUIRING CLOSE EXAMINATION OF THE PRODUCT, SHOULD BE PROVIDED AND SHOULD NOT ALTER COLOURS — FF 5.1.2.9/Mod

Light bulbs and fixtures suspended over the working areas where cephalopods are handled at any stage of preparation, should be of the safety type or otherwise protected to prevent food contamination in case of breakage.

It is highly desirable to have the light fixtures either recessed flush with the ceiling or with the upper surface of the light fixtures fitting flush with the ceiling in order to prevent the accumulation of dust on them.

5.1.2.10 SEPARATE AND ADEQUATE STORAGE SHOULD BE PROVIDED FOR WOOD, SAWDUST OR SIMILAR MATERIALS USED IN SMOKING OF CEPHALOPODS — SMF 4.1.2.10/Mod

Wood, wood shavings or sawdust should be stored in a separate storage room or building away from the cephalopods processing area and in such a manner that there is no contamination by dust or other foreign matter.

To prevent spontaneous heating and the growth of moulds, the wood shavings and sawdust should be sufficiently dry on delivery and should not be stored in large containers, heaps or silos. Storage in bags is advantageous as it allows better aeration, drying and more convenient handling.

5.1.3 Hygiene Facilities

5.1.3.1 AREAS WHERE RAW MATERIALS ARE RECEIVED, STORED OR HANDLED, SHOULD BE SEPARATED FROM THE AREAS IN WHICH PRODUCT PREPARATION, PROCESSING AND PACKAGING ARE CONDUCTED — FF 5.1.3.1/Mod

Well defined areas of adequate size, preferably separate rooms, should be provided for receiving and storing of raw materials.

Receiving and storage areas should be clean and readily capable of being maintained in a clean condition and should provide protection for the raw cephalopods from deterioration and contamination.

5.1.3.2 A SEPARATE REFUSE ROOM OR OTHER EQUALLY ADEQUATE OFFAL STORAGE FACILITIES SHOULD BE PROVIDED ON THE PREMISES — FF 5.1.3.2

If offal or other refuse is to be collected and held before removal, adequate precautions should be taken to protect it against rodents, birds, insects and exposure to warm temperatures.

A separate refuse room for storing waste in water-tight containers or offal bins should be provided. The walls, floor and ceiling of such a storage room, and the area under the elevated bins, should be constructed of impervious material which can be readily cleaned. Where waste material is held in containers outside the establishment, the

containers should be lidded. A separate enclosure should be provided for their storage with easy access for vehicles loading and unloading. Stands for the containers should be of solid, hard and impervious material, which can be easily cleaned and properly drained.

If containers are used in large numbers, a mechanical washing plant might be advisable to provide for routine washing. Containers should be capable of withstanding repeated exposure to normal cleaning processes.

5.1.3.3 ANY BY-PRODUCT PLANT SHOULD BE ENTIRELY SEPARATE FROM THE PLANT WHICH IS PROCESSING FRESH CEPHALOPODS FOR HUMAN CONSUMPTION FF 5.1.3.3/Mod

The layout and construction of a plant processing cephalopods for human consumption should be such as to ensure that the areas in which cephalopods for human consumption are held, processed and stored are used for these purposes only.

Any processing of by-products or non-fish products, not intended for human food, should be conducted in separate buildings or in areas which are physically separated in such a way that there is no possibility for contamination of fresh or processed cephalopods.

5.1.3.4 AN AMPLE SUPPLY OF COLD AND HOT POTABLE WATER AND/OR CLEAN SEA WATER UNDER ADEQUATE PRESSURE SHOULD BE AVAILABLE AT NUMEROUS POINTS THROUGHOUT THE PREMISES AT ALL TIMES DURING WORKING HOURS FF 5.1.3.4/Mod

All water available for use in those parts of establishments where cephalopods are received, held, processed, packaged and stored should be potable water or clean sea water and should be supplied at a pressure of no less than 1.4 kg/cm^2 (20 lb/in^2). If sea water is used, it must be clean sea water.

An adequate supply of hot water of potable quality and suitable temperature should be available at all times during working hours.

Water used for washing or conveying raw materials should not be recirculated unless it is restored to a level of potable quality.

5.1.3.5 WHEN INPLANT CHLORINATION OF WATER IS USED, THE RESIDUAL CONTENT OF FREE CHLORINE SHOULD BE MAINTAINED AT NO MORE THAN THE MINIMUM EFFECTIVE LEVEL FOR THE USE INTENDED FF 5.1.3.5

The cold water supply used for cleaning purposes should be fitted with an in-line chlorination system allowing the residual chlorine content of the water to be varied at will in order to reduce multiplication of micro-organisms and prevent the build-up of fish odours.

A chlorination system should not be relied on to solve all hygiene problems. The indiscriminate use of chlorine cannot compensate for a non-hygienic condition in a processing plant.

5.1.3.6 ICE USED IN THE OPERATION IN CEPHALOPOD PROCESSING ESTABLISHMENTS SHOULD BE MADE FROM POTABLE WATER OR CLEAN SEA WATER

A special room, or other suitable storage facilities, should be provided to protect the ice from contamination and excessive meltage. Dust, flakes of paint, bits of wood or sawdust, straw and rust, are the most frequent impurities transferable by ice into the final product.

Care must be taken to ensure that ice used to chill the raw material or products does not contaminate them.

5.1.3.7 WHERE A NON-POTABLE AUXILIARY WATER SUPPLY IS USED THE WATER SHOULD BE STORED IN SEPARATE TANKS AND CARRIED IN SEPARATE LINES, IDENTIFIED BY CONTRASTING COLOURS AND LABELLED AND WITH NO CROSS-CONNECTIONS OR BACKSIPHONAGE WITH THE LINES CARRYING POTABLE WATER — FF 5.1.3.7/Mod

Non-potable water may be used for such purposes as producing steam, cooling heat exchangers and fire protection.

It is very important that the systems of storage and distribution of potable and non-potable water are entirely separate and there is no possibility for cross-connection or for inadvertent usage of non-potable water in the processing areas. Only potable quality water should be used for the supply of hot water.

5.1.3.8 ALL PLUMBING AND WASTE DISPOSAL LINES, INCLUDING THE SEWER SYSTEM SHOULD BE LARGE ENOUGH TO CARRY PEAK LOADS AND SHOULD BE PROPERLY CONSTRUCTED — FF 5.1.3.8

All lines should be water-tight and have adequate deep seal traps and vents. Waste should not be disposed of in a way that may contaminate potable water or clean sea water supplies.

Sumps or solid matter traps of the drainage system should preferably be located outside the processing area and so designed as to allow them to be emptied and thoroughly cleaned at the end of each working day.

The plumbing and manner of waste disposal should be approved by the official agency having jurisdiction.

5.1.3.9 PROPER FACILITIES FOR WASHING AND DISINFECTION OF EQUIPMENT SHOULD BE PROVIDED — FF 5.1.3.9/Mod

Facilities should be present in every cephalopod processing establishment for cleaning and disinfection of trays, removable cutting or filleting boards, containers and other similar equipment and working implements. Such facilities should be located in a separate room or in a designated area in the work rooms where there is an adequate supply of hot and cold potable water or clean sea water, under good pressure, and where there is proper drainage.

Any containers and equipment used for offal or contaminated materials should not be washed in the same area.

5.1.3.10 ADEQUATE AND CONVENIENTLY LOCATED TOILET FACILITIES SHOULD BE PROVIDED FF 5.1.3.10

Toilet rooms should have walls and ceilings of a smooth washable, light-coloured surface and floors constructed of impervious and readily cleanable material. Toilet facilities should be well lit, ventilated and kept in a hygienic condition at all times. Adequate supply of toilet paper should be available in each toilet cubicle.

The doors leading to the facilities should be of a self-closing type and should not open directly into the processing areas.

Handwashing facilities of a type not requiring operation by hand, with an adequate supply of warm or hot and cold potable water or clean sea water, with liquid or powdered soap and with suitable hygienic means of drying the hands, should be provided adjacent to the toilets and in such a position that the employee must pass them when returning to the processing room. Where hot and cold water are available, mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles for used towels should be provided.

Notices should be posted directing personnel to wash their hands after using the toilets.

The following formula could be used as a guideline in assessing the adequacy of toilet facilities in relation to the number of employees:

1 to 9 employees = 1 toilet
10 to 24 employees = 2 toilets
25 to 49 employees = 3 toilets
50 to 100 employees = 5 toilets

for every 30 employees over 100 = 1 toilet

5.1.3.11 FACILITIES SHOULD BE AVAILABLE IN THE PROCESSING AREAS FOR EMPLOYEES TO WASH AND DRY THEIR HANDS AND FOR DISINFECTION OF PROTECTIVE HAND COVERINGS FF 5.1.3.11

In addition to hand washing facilities available in toilet rooms, a number of wash basins with an adequate supply of hot and cold potable water or clean sea water and liquid or powdered soap, should be provided whenever the process demands. They should be located in full view of the processing floor and should be of a type not requiring operation by hand or be fed by a continuous flow of potable water or clean sea water. Single-use paper towels are recommended, otherwise the method of drying hands should be approved by the official agency having jurisdiction. The facilities should be kept in a hygienic condition at all times.

5.1.3.12 STAFF AMENITIES CONSISTING OF LUNCH ROOMS, CHANGING ROOMS OR ROOMS CONTAINING SHOWER OR WASHING FACILITIES SHOULD BE PROVIDED FF 5.1.3.12

Where workers of both sexes are employed, separate facilities should be present for each, except that the lunch rooms may be shared. As a general guide, the lunch rooms should provide seating accommodation for all employees and the changing rooms should provide enough space for lockers for each employee without causing undue congestion. Clothing and footwear, not worn during working hours, must not be kept in any processing area.

5.1.3.13 SALT AND OTHER INGREDIENTS USED IN CURING OF CEPHALOPODS SHOULD BE STORED DRY AND IN A MANNER TO PREVENT THEIR CONTAMINATION — SMF 4.1.3.13/Mod

Salt and other ingredients used for processing cephalopods should be of food grade.

5.1.3.14 STORAGE FACILITIES SHOULD BE AVAILABLE FOR THE PROPER DRY STORAGE OF PACKAGING MATERIALS — FF 5.1.3.13

Separate facilities for the storage of cartons, wrappings or other packaging materials should be provided in order to protect them against moisture, dust or other contamination.

5.1.3.15 IF POISONOUS OR HARMFUL MATERIALS, INCLUDING CLEANING COMPOUNDS, DISINFECTANTS AND PESTICIDES ARE STORED, THEY SHOULD BE KEPT IN A SEPARATE ROOM DESIGNED AND MARKED SPECIFICALLY FOR THIS PURPOSE — FF 5.1.3.14

All such materials must be prominently and distinctly labelled so that they can be easily identified. The room should be kept locked and the materials contained in it should be handled only by personnel trained in their use.

5.2 Equipment, Utensils and Working Surfaces

5.2.1 ALL WORKING SURFACES AND ALL CONTAINERS, TRAYS, TANKS, VATS OR OTHER EQUIPMENT USED FOR PROCESSING CEPHALOPODS SHOULD BE OF SMOOTH, IMPERVIOUS, NON-TOXIC MATERIAL WHICH IS CORROSION-RESISTANT AND SHOULD BE DESIGNED AND CONSTRUCTED TO PREVENT HYGIENIC HAZARDS AND PERMIT EASY AND THOROUGH CLEANING. IN GENERAL THE USE OF WOOD FOR THIS PURPOSE IS NOT RECOMMENDED — SMF 4.2.1.1/Mod

Contamination of cephalopods during processing can be caused by contact with unsatisfactory surfaces. All food contact surfaces should be smooth, free from pits and crevices, substances harmful to man, unaffected by salt, body fluids from cephalopods or other ingredients used, and capable of withstanding repeated cleaning and disinfection. Wood should be used for cutting surfaces only when no other suitable material is available. Machines and equipment should be so designed that they can be easily dismantled to facilitate thorough cleaning and disinfection.

Containers, vats and barrels used for holding cephalopods should preferably be constructed of plastic or corrosion-resistant metal and, if of wood, they should be treated to prevent the entry of moisture and coated with a durable non-toxic paint or other surface coating that is smooth and readily washable. Wicker baskets should not be used.

Stationary equipment should be installed to permit easy access and thorough cleaning and disinfection.

Cephalopods washing tanks should be designed to provide a constant change of water with good circulation, and to have provisions for drainage and to be easily cleaned.

Equipment and utensils used for inedible or contaminated materials should be identified as such and should not be used for handling of cephalopods and products intended for human consumption.

5.2.2 BOARDS AND OTHER SURFACES ON WHICH CEPHALOPODS ARE CUT SHOULD BE MADE OF IMPERVIOUS MATERIALS WHICH MEET THE PHYSICAL REQUIREMENTS FOR CUTTING SURFACES — SMF 4.2.1.2/Mod

Considerable microbial contamination of cephalopods is caused by contact with the filleting and cutting boards. Wooden cutting surfaces are porous and quickly become waterlogged and are practically impossible to clean thoroughly. They are not recommended as suitable for this type of work.

If in the absence of other materials wood has to be used, a single board of a well finished and smooth surface is recommended. Once the surface becomes badly worn or pitted, then the board should be reconditioned or discarded.

The use of plywood or other boards of laminated structure should be discouraged.

5.2.3 THE USE OF PROPERLY DESIGNED MACHINES FOR GUTTING, WASHING, SPLITTING, SKINNING, STEAKING, BRINING AND TENTERING IS TO BE ENCOURAGED — SMF 4.2.1.3/Mod

Where large quantities of cephalopods are processed, properly designed machines will simplify the production of cephalopod products in quantity with consistently low bacterial counts. This is mainly because well designed machines have impervious and corrosion-resistant working surfaces, are easy to dismantle, clean, disinfect and are capable of handling the cephapolods with a minimum of delay.

It is essential that the installation of new machinery should be well researched and economically justified. The units should be rigorously tested before being put into commercial use, otherwise costly failures may arise.

5.2.4 BRINING AND SALTING VATS SHOULD BE MADE OF SUITABLE CORROSION-RESISTANT MATERIAL AND SHOULD BE SO CONSTRUCTED AS TO PERMIT EASY CLEANING AND COMPLETE DRAINAGE — SMF 4.2.1.4

Such vats or containers could become a serious source of contamination by micro-organisms, rust, dirt and miscellaneous detritus if not made of suitable material or if not kept clean.

5.2.5 COOKERS SHOULD BE DESIGNED TO PROVIDE CONSTANT AND ADEQUATE SUPPLY OF HEAT SO THAT ALL CEPHALOPODS COULD BE GIVEN THE SAME TIME/TEMPERATURE EXPOSURE DURING THE COOKING OPERATION — SP 4.2.5/Mod

Cooking, or any other heat treatment of cephalopods, is a very critical process as far as the yield and quality of the final product are concerned.

The cooker should be constructed to provide a good control of time/temperature exposure of the cephalopods at the maximum processing load.

It is poor practice to keep cephalopods in hot water for a long time before the boiling commences. Furthermore, an inadequately fired cooker will slow down the whole operation sequence.

5.2.6 COOKERS SHOULD BE MADE OF SUITABLE CORROSION-RESISTANT MATERIAL AND BE BUILT IN SUCH A WAY THAT THEY CAN BE DRAINED AND EASILY DISMANTLED FOR CLEANING — SP 4.2.6/Mod

All parts of the cooker that come in contact with the cephalopods should be made of suitable corrosion-resistant material. The cooker, of a conventional or continual type, should be designed to permit easy and frequent drainage and dismantling for washing and sanitizing.

5.2.7 SUITABLE EQUIPMENT FOR COOLING OF COOKED CEPHALOPODS SHOULD BE PROVIDED — SP 4.2.7/Mod

Cephalopods should be cooled rapidly and thoroughly either by immersion in a tank containing clean sea water or by exposure to an effective air cooling system.

The cooling tank should be of suitable corrosion-resistant material and should be designed to provide a constant change of water with good circulation. It should be located close to the cooker, but in such a way that the chance of contamination with micro-organisms derived from the raw cephalopods is reduced to a minimum.

5.2.8 DRYING EQUIPMENT SHOULD BE OF ADEQUATE CAPACITY FOR THE INTENDED PRODUCTION

In sun-drying, the drying proceeds so slowly in most cases, especially in bad weather, that a certain amount of decomposition is likely to take place prior to the desired reduction in water content is attained. Therefore where economically justified, use of a mechanical dryer should be recommended.

5.2.9 REFRIGERATION AND FREEZING EQUIPMENT SHOULD BE PROPERLY DESIGNED AND CONSTRUCTED AND SHOULD BE OF ADEQUATE CAPACITY — Lob 5.2.5/Mod

The freezing equipment should be designed and operated in accordance with the requirements stated in the Recommended International "Code of Practice for Frozen Fish" (CAC/RCP 9-1976) so that freezing of cephalopods is accomplished rapidly.

5.2.10 ALL FREEZER AND COLD STORAGE FACILITIES SHOULD BE ADEQUATE FOR THE INTENDED PRODUCTION AND SHOULD BE FITTED WITH AUTOMATIC TEMPERATURE CONTROLLING AND RECORDING DEVICES — Lob 5.2.6/Mod

Frozen cephalopods and their products should be stored at a uniformly low temperature if a considerable quality loss is to be avoided. Freezer stores should be able to operate at -30°C (-22°F) or lower as cephalopods deteriorate more rapidly than fish. Thermometers, or other temperature recording devices, should be capable of being read easily within a 2° accuracy. More detailed requirements for the construction and operation of a freezer store are given in the Recommended International "Code of Practice for Frozen Fish" (CAC/RCP 9-1976).

5.2.11 TRANSPORT VEHICLES SHOULD BE DESIGNED TO PROTECT CEPHALOPODS FROM WARMING UP DURING TRANSPORTATION AND SHOULD BE OF SUCH MATERIAL AND CONSTRUCTION AS TO PERMIT EASY AND THOROUGH CLEANING

FF 5.2.11/Mod

Vehicles used for transporting cephalopods and cephalopod products should be designed to provide some means of refrigeration and constructed to ensure constant protection to the cephalopods against contamination by dust and the drying effect of sun or wind. Even where ice is very cheap and journey times or distances are relatively short, the use of an insulated vehicle provides an additional insurance against inadequate icing or unforeseen delays. The walls, roof and the floor of the vehicle should be insulated. The thickness of insulation employed will depend on the outside temperatures normally encountered. It should be remembered that insulation cannot help to cool the cephalopods but helps to keep it at the temperature at which it was put into the vehicle.

Vehicles used for transporting frozen cephalopods should be capable of maintaining the cephalopods at a temperature appropriate of -18°C (0°F) or less.

For the purpose of cleaning, the vehicles transporting cephalopods should have the wall, floor and roof linings made of suitable corrosion-resistant material with smooth and non-absorbent surface. Floors should be adequately drained.

5.2.12 THE PROCESSING PLANTS SHOULD BE EQUIPPED WITH EITHER TRADITIONAL OR MECHANICAL SMOKING KILN

SMF 4.2.2.1/Mod

Both types of kilns, traditional and mechanical, should be preferably designed and constructed by specialists to ensure safe and efficient operation and to facilitate easy cleaning.

The mechanical kiln gives better prospects for controlling the operation and the quality of the final product. The traditional kiln is essentially a large chimney with means to suspend cephalopods strung on tenters (sticks or rods on which cephalopods are hung) over a fire of smouldering wood. It is easy and cheap to construct. In this type of kiln the hot air generated by the smouldering wood in the kiln creates a vertical current of smoke which passes the cephalopods to be smoked. The speed of this current is usually slow and uneven. Some improvement and a limited amount of process control can be obtained by installing a suction fan and dampers in the chimney at the top of the kiln. Recirculation of smoke is not practised.

The traditional type of kiln should preferably be constructed of material with good insulation properties such as bricks. This results in smaller heat losses, in more uniform temperature distribution, and prevents the condensation of moisture on the inner surfaces during cold weather.

The inner surface of the kiln should preferably be finished smoothly with a lining such as stainless steel or other suitable material to facilitate cleaning of the walls with steam and hot water.

In a traditional kiln the fire must be looked after constantly as it could flare up suddenly and cook, or even burn, the lowest hanging cephalopods. For this reason, therefore, it is advisable to equip the kiln with a high temperature alarm device which is relatively inexpensive and simple to install. The fire in the traditional kiln is usually built up of a layer of wood shavings covered by a layer of moist sawdust and should be attended by an experienced operator.

The mechanical kiln offers many more possibilities for process control. The movement of the air-smoke mixture in this type of kiln is done by ventilators (electric fans). The speed of the air-smoke current can be controlled as well as its relative humidity. If fitted with cooling coils, the temperature can be more precisely controlled and this facility will be of particular value in cold smoking.

Smoke required for the mechanical kiln is always produced outside the chamber in which cephalopods are smoked, either in a simple fire box or a more sophisticated smoke generator. The positive movement of the air-smoke mixture through the kiln allows for its recirculation which, in turn, will result in better fuel utilization.

In large and long mechanical kilns, in order to create more uniform processing conditions, it is advisable to shift the product's position with respect to the point of entry of the smoke or to provide for reheating of the air-smoke mixture during its passage.

5.3 Hygienic Operating Requirements

5.3.1 CEPHALOPOD PROCESSING SHOULD ALWAYS BE CARRIED OUT IN A HYGIENIC MANNER

SMF 4.3.1/Mod

All the handling, processing and packaging of cephalopods should be carried out in a clean manner.

Precautions should be taken at all times to protect the cephalopods from contamination by animals, insects, birds, chemical or microbiological contaminants or other objectionable substances.

Preparatory operations leading to the finished product and the packaging operations should be so timed as to permit expeditious handling of consecutive batches in production within the time and temperature range that will prevent deterioration, spoilage or the multiplication of micro-organisms of public health significance.

It is considered good practice to develop a schedule of permitted times in which each operation will be allocated a definite portion of the total time permitted for each **batch of cephalopod to remain on the premises of the processing plant.**

5.3.2 THE BUILDING, EQUIPMENT, UTENSILS AND OTHER PHYSICAL FACILITIES OF THE PLANT SHOULD BE KEPT CLEAN, IN GOOD REPAIR AND SHOULD BE MAINTAINED IN AN ORDERLY AND HYGIENIC CONDITION

FF 5.3.2/Mod

All surfaces which come in contact with fresh cephalopods should be hosed down with cold or hot water of potable quality, or clean sea water, as frequently as necessary to ensure cleanliness. It is important that the cleaning method used will remove all residues and the disinfecting method will reduce the microbial population of the surface being cleaned.

The use of cold or hot potable water alone is generally not sufficient to accomplish the required result. It is desirable, if not essential, that aids such as suitable cleaning and disinfecting agents, together with manual or mechanical scrubbing, wherever appropriate, be used to assist in achieving the desired objective. After the application of cleaning and disinfecting agents the surfaces which come in contact with cephalopods should be cleansed thoroughly with cool potable water or clean sea water before use.

Cleaning agents and disinfectants used should be approved by the official agency having jurisdiction, should be appropriate for the purpose, and should be so used as to present no hazard to public health.

5.3.3 SPLITTING AND CUTTING BOARDS SHOULD BE FREQUENTLY AND THOROUGHLY SCRUBBED AND TREATED WITH DISINFECTANT. WHEREVER PRACTICABLE, THE BOARDS SHOULD BE CONTINUOUSLY FLUSHED WITH RUNNING POTABLE OR CLEAN SEA WATER DURING USE FF 5.3.3/Mod

It is recognized that the degree of microbial contamination found on cephalopods and cephalopod products is related to microbial contamination of the working surfaces on which they are processed. All such surfaces should, therefore, be cleaned, scrubbed and disinfected, at least at the end of each working day.

5.3.4 ALL MACHINES USED FOR GUTTING, BEATING, WASHING, SPLITTING, TENTERING OR SIMILAR OPERATIONS SHOULD BE THOROUGHLY CLEANED, DISINFECTED AND RINSED DURING REST OR MEAL BREAKS AND BEFORE RESUMPTION OF PRODUCTION FOLLOWING OTHER WORK STOPPAGES FF 5.3.5/Mod

The use of machinery reduces the risk of contamination from human sources. If, however, these machines are not properly maintained and cleaned at least once every day, they can become a serious source of contamination.

5.3.5 CLEANING OF SMOKING AND DRYING EQUIPMENT SHOULD BE MADE INTO A REGULAR ROUTINE SMF 4.3.7/Mod

The periodical removal of tarry deposits on walls, ceilings, fans, tenters, racks, trolleys, etc., is necessary not only for hygienic reasons but also to reduce the risk of fire.

Both the traditional and the mechanical kilns used for smoking and drying present a potential fire hazard if large amounts of tar are allowed to accumulate.

Centrifugal fans are likely to collect an appreciable amount of tar in the fan housing. A special drain hole should be provided on the bottom of the fan's enclosure.

Cleaning methods usually involve the application of alkaline solutions. This can be done manually with a brush or can be sprayed on the walls and ceilings by means of a spray gun which is connected to a hot water or steam supply. The detergent and the dissolved deposits should be rinsed off thoroughly with a copious amount of clean water. For better and more uniform contact of the detergent with the soild surfaces the use of a foam solution of detergent is recommended.

Easy day-to-day maintenance can be achieved by installing permanent rotating spray nozzles inside the smoking kiln.

Whenever new kilns are being designed, consideration should be given to the accessibility of all parts for easy cleaning; necessary drainage points must be provided.

5.3.6 THE BRINE WHICH EXUDES DURING THE DRY-SALTING OF CEPHALOPODS SHOULD BE DISCARDED UNLESS THE RECOVERY OF SALT COULD BE ECONOMICALLY JUSTIFIED

SMF 4.4.3.5/Mod

The resulting brine from the dry-salting operation will contain a high concentration of impurities, such as sugar, particles of dirt, slime, blood, gut content, dissolved proteins and other foreign matter. Such impurities, if not removed, will contaminate the subsequent loads of cephalopods and will, in turn, affect the quality of the final product.

In some countries, where salt is an expensive comodity, it may be worthwhile to recover it from the used brine.

5.3.7 UTENSILS AND FOOD-CONTACT SURFACES OF EQUIPMENT SHOULD BE PROTECTED FROM CONTAMINATION

SMF 4.3.6/Mod

Cleaned and disinfected portable equipment and utensils should be stored above the floor in a clean, dry location. Suitable space and facilities should be provided for such storage so that food-contact surfaces are protected from splash, dust, and other contamination.

The same requirement should also apply to the exposed food-contact surfaces of the fixed equipment.

Utensils should be air-dried before being stored or should be stored in a self-draining position on hooks or racks constructed of corrosion-resistant material. When the storage in protective liquids or other solutions is practised, the equipment and utensils so stored should subsequently be washed, disinfected and rinsed prior to re-use. Wherever practicable, stored containers and utensils should be covered or inverted.

5.3.8 SINGLE SERVICE ARTICLES, SUCH AS PLASTIC BAGS, BOXES AND PACKAGING MATERIALS SHOULD BE STORED IN A SEPARATE ROOM AND IN CLOSED CARTONS OR CONTAINERS TO PROTECT THEM FROM CONTAMINATION

Such articles should be handled and dispensed in such a manner as to protect them from contamination with dust, dirt, water, insects, rodents, birds, or other vermin.

5.3.9 ONLY NEW AND CLEAN BOXES, CARTONS AND WRAPPING MATERIAL SHOULD BE USED FOR THE TRANSPORT AND DISTRIBUTION OF PROCESSED CEPHALOPOD PRODUCTS

FF 5.3.10/Mod

As it is very important to protect processed cephalopod products from all sources of contamination, only new or clean non-returnable containers should always be used.

5.3.10 WATER USED FOR WASHING OR CONVEYING RAW MATERIALS, INCLUDING SEA WATER FOR CONVEYANCE OF CEPHALOPODS INTO THE PLANT, SHOULD BE FROM SUCH A SOURCE, OR SUITABLY TREATED, AS NOT TO CONSTITUTE A PUBLIC HEALTH HAZARD — SMF 4.3.10/Mod

During gutting or for washing cephalopods, equipment and utensils, water of potable quality or clean sea water should be used. It should not be recirculated unless suitably treated to meet the required standards of potability.

5.3.11 REMOVAL OF SOLID, SEMI-SOLID OR LIQUID WASTES FROM CEPHALOPOD UNLOADING, HOLDING AND PROCESSING AREAS SHOULD BE ON A CONTINUOUS OR NEAR CONTINUOUS BASIS USING WATER AND/OR APPROPRIATE EQUIPMENT SO THAT THESE AREAS ARE KEPT CLEAN AND THERE IS NO DANGER OF CONTAMINATING THE PRODUCT — FF 5.3.12/Mod

All waste materials resulting from the operation of a processing plant should be disposed of as soon as possible in a way that they cannot be used for human food and in a manner that they cannot contaminate food and water supplies and offer harbourage or breeding places for rodents, insects, or other vermin.

Containers, flumes, conveyors, bins or storage bays used for removal, collection or storage of offal and other waste, should be cleaned frequently with potable water or clean sea water containing an appropriate amount of free chlorine.

All waste material from containers and vehicles should be removed in such a way as not to cause any contamination and not to create a nuisance.

Arrangements for the disposal of trade refuse and inedible waste should be approved by the appropriate official agency having jurisdiction.

5.3.12 EFFECTIVE MEASURES SHOULD BE TAKEN TO PROTECT AGAINST THE ENTRANCE INTO THE PREMISES AND THE HARBOURAGE ON THE PREMISES OF INSECTS, RODENTS, BIRDS OR OTHER VERMIN — FF 5.3.13/Mod

An effective and continuous programme for the control of insects, rodents, birds or other vermin within the establishment should be maintained. The plant and surrounding area should be regularly examined for evidence of infestation. Where control measures are necessary, treatment should be under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of harmful residues being retained by the cephalopods or their products. The chemical, biological or physical agents used should meet the requirements of the official agency having jurisdiction.

The use of insecticides, during the plant operation, without any provision for collection of dead insects, should be discouraged. Instead the use of adhesive insect traps or very efficient "black light insecticutor" lamps with the attached collecting trays, are recommended. Insect traps should not be located directly over the processing areas and should be away from windows and doors.

All rodenticides, fumigants, insecticides or other harmful substances should be of an approved type and should be stored in separate locked rooms or cabinets and handled only by properly trained personnel.

5.3.13 DOGS, CATS AND OTHER ANIMALS SHOULD BE EXCLUDED FROM AREAS WHERE CEPHALOPODS IS RECEIVED, HANDLED, PROCESSED OR STORED FF 5.3.14/Mod

Dogs, cats and other animals are potential carriers of diseases and should not be allowed to enter or to live in rooms or areas where cephalopods or their products are handled, prepared, processed or stored.

5.3.14 ALL PERSONS WORKING IN A CEPHALOPOD PROCESSING PLANT SHOULD MAINTAIN A HIGH DEGREE OF PERSONAL CLEANLINESS WHILE ON DUTY AND SHOULD TAKE ALL NECESSARY PRECAUTIONS TO PREVENT THE CONTAMINATION OF THE CEPHALOPOD PROCESSING OR FISH PRODUCTS OR INGREDIENTS WITH ANY FOREIGN SUBSTANCE FF 5.3.15/Mod

All employees should wear, appropriate to the nature of their work, clean protective clothing including a head covering and footwear, all of which articles are either washable or disposable. The use of waterproof aprons, where appropriate, is recommended.

Gloves used in the handling of cephalopods should be maintained in a sound, clean and sanitary condition and should be made of an impermeable material except where their usage would be incompatible with the work involved. Hands should be washed thoroughly with soap or another cleansing agent and warm water before commencing work, on every occasion after visiting the toilet, before resuming work, and whenever necessary. The wearing of gloves does not exempt the operator from having thoroughly washed hands.

Any behaviour which can potentially contaminate the cephalopods, such as eating, smoking, chewing of tobacco or other materials and spitting should be prohibited in any part of the handling areas.

5.3.15 NO PERSON WHO IS KNOWN TO BE SUFFERING FROM, OR WHO IS A CARRIER OF ANY COMMUNICABLE DISEASE OR HAS AN INFECTED WOUND OR OPEN LESION, SHOULD BE ENGAGED IN THE PREPARATION, HANDLING OR TRANSPORTING OF FRESH OR PROCESSED CEPHALOPODS FF 5.3.16/Mod

Plant management should require that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, should immediately report to the management. Management should not allow any person known to be affected with a disease capable of being transmitted through food, or known to be a carrier of such disease, or while afflicted with infected wounds, sores or diarrhoea, to work in any area of a plant in a capacity in which there is a likelihood of such a person contaminating raw or processed cephalopods with disease-causing micro-organisms.

Minor cuts and abrasions on the hands should be immediately treated and covered with a suitable waterproof dressing of contrasting colour and of a nature that it cannot be accidently detached, but if infection should occur subsequently, the worker should not be allowed to handle the cephalopods.

5.3.16 CONVEYANCES USED FOR TRANSPORTING CEPHALOPODS SHOULD BE CLEANED AND DISINFECTED IMMEDIATELY AFTER EACH USE AND SHOULD BE SO MAINTAINED AS NOT TO CONSTITUTE A SOURCE OF CONTAMINATION FOR THE PRODUCT — FF 5.3.17/Mod

The cleaning of vehicles, together with receptacles and equipment thereon, should be planned to a regular routine. Hosing, scrubbing and cleaning with potable water or clean sea water, to which a suitable detergent or disinfectant has been added, is usually necessary.

5.4 Operating Practices and Production Requirements

5.4.1 General Considerations

5.4.1.1 THE CEPHALOPOD PRODUCTS SHOULD BE OF A GOOD QUALITY, WELL PREPARED AND PACKAGED SO THAT THEY WILL REMAIN ATTRACTIVE AND SAFE TO EAT — SMF 4.4.1.1/Mod

Cephalopods which are not good enough to be sold as fresh or frozen should not be used for the processing of other products. Processing cannot correct faults that are due to the poor physiological condition of the raw material, improper handling practices or prolonged storage.

Even in smoking of cephalopods, the poor quality raw material will result in poor quality final product despite the masking effect of smoke on taste, odour and colour of cephalopod meats.

5.4.2 Handling of Raw Material

5.4.2.1 ALL CEPHALOPODS SHOULD BE CAREFULLY INSPECTED, SORTED, OR CULLED BEFORE THEY ARE PROCESSED. ANY DAMAGED, CONTAMINATED OR OTHERWISE UNACCEPTABLE CEPHALOPODS SHOULD BE DISCARDED — SMF 4.4.2.3/Mod

The quality and keeping time of the final product is largely dependent on the quality of the raw cephalopods from which it is produced.

Cephalopods which are damaged (crushed, mutilated) will produce a very poor or unacceptable product and, if contaminated in any way, can spread this contamination to working surfaces and other raw cephalopods.

5.4.2.2 ALL CEPHALOPODS SHOULD BE THOROUGHLY WASHED BEFORE PROCESSING OR IMMEDIATELY AFTER OPERATIONS LIKE DRESSING — SMF 4.4.2.4/Mod

Spoilage micro-organisms come mainly from the surface of the cephalopods and their digestive tract. Experience has shown that a large part of the surface micro-organisms can be removed by proper washing.

During the dressing, eviscerating (gutting), or trimming operations, each cephalopod should be washed by a flow or spray of potable water or clean sea water which is sufficient in quantity and pressure and is applied in such a manner as to clean the cephalopods thoroughly.

Water used for washing, rinsing or conveying, should not be recirculated unless suitably treated to maintain a potable level of quality.

5.4.2.3 **WHERE CEPHALOPODS ARE BEING GUTTED, PEN REMOVED, SKINNED OR PORTIONED, THESE OPERATIONS SHOULD BE CARRIED OUT IN A CLEAN AND HYGIENIC MANNER.** SMF 4.4.2.5/Mod

All waste material resulting from these operations should be collected immediately into suitable containers which are removed and emptied regularly or be removed continuously by mechanical means or flumes.

5.4.2.4 THAWING OF FROZEN CEPHALOPODS PRIOR TO PROCESSING SHOULD BE DONE IN THE MANNER OUTLINED IN THE RECOMMENDED INTERNATIONAL "CODE OF PRACTICE FOR FROZEN FISH"

The thawing method chosen should suit the volume and type of product that is to be processed and should be economically feasible. Exposure of cephalopods to elevated temperatures during the thawing should be carefully controlled.

Where cephalopods are thawed in still air, the ambient temperature should not exceed 18°C (65°F).

The water used for thawing should be either potable or clean sea water and its temperature should not exceed 20°C (68°F). Maximum time for use of water in batch thawing should not exceed 4 h.

All thawing operations should be carried out under strict hygienic conditions.

5.4.3 Cooking

5.4.3.1 ALL EQUIPMENT USED IN THE COOKING AND COOLING OF CEPHALOPODS SHOULD BE FREQUENTLY HOSED DOWN, BRUSHED TO REMOVE ALL VISIBLE DIRT, CLEANED WITH A SUITABLE CLEANING AGENT, DISINFECTED AND RINSED THOROUGHLY SP 4.3.8/Mod

During the cooking of cephalopods, impurities such as sand, clay, miscellaneous sea-bottom detritus, parts of cephalopods and coagulated proteinaceous material accumulate. These may discolour the cooked cephalopods and introduce undesirable odours and flavours. Foam which is formed in dirty cooking water may harbour and protect the spores of thermophilic micro-organisms and this may cause trouble during subsequent processing.

It is important, therefore, that a thorough cleaning of the cooker, cooling tank and other associated equipment should be carried out frequently and at least once daily.

5.4.3.2 PERSONNEL ENGAGED IN COOKING, COOLING AND HANDLING OF COOKED CEPHALOPODS SHOULD TAKE ALL THE NECESSARY PRECAUTIONS NOT TO CONTAMINATE THE COOKED PRODUCT WITH MICRO-ORGANISMS WHICH MIGHT CAUSE SPOILAGE OR CONSTITUTE A PUBLIC HEALTH HAZARD SP 4.3.9/Mod

Cephalopods, when removed from the cooker, are practically free from living micro-organisms. Recontamination commences during

cooling and increases progressively during further handling. Workers who are engaged in cooking, cooling or handling of cephalopods should maintain the same high degree of personal cleanliness as workers in other parts of the processing plant. If the same worker handles the raw, as well as the cooked product, precautions should be taken to prevent contamination of cooked cephalopods with micro-organisms from the raw material.

5.4.4 Dry-Salting

5.4.4.1 DRY-SALTING SHOULD BE CARRIED OUT WITH THE FULL UNDERSTANDING OF THE EFFECT ON THE QUALITY OF THE FINAL PRODUCT AND SHOULD BE DONE UNDER STRICT HYGIENIC CONDITIONS SMF 4.4.3.1/Mod

Dry-salting gives the processed product its taste, appearance (attractive gloss), texture and prolongs its shelf life.

As there is usually a loss of moisture from the cephalopods, strict control of the process should be maintained in order to keep the resulting loss of weight within the profit margin of the operation.

To assure the uniform salt and sugar contents of the final product, the cooked cephalopods in dry-salting batch should be uniform in size and weight.

As a proper dry-salting procedure, it is advisable to arrange the cephalopods, which were sprinkled with salt, sugar and flavouring materials, in stainless steel containers in several layers. The top layer should be weighted to achieve uniform distribution of salt and sugar in the product.

5.4.4.2 DRY FOOD GRADE QUALITY, SALT AND SUGAR SHOULD BE USED IN DRY-SALTING OF CEPHALOPODS

Salt used in the salting of cephalopods should be of good grade and with the least of impurities.

The composition of salt differs according to the origin. Some of the mine salts could be almost pure sodium chloride while the others could contain a high concentration of other salts like calcium sulphate, magnesium sulphate and chloride as impurities.

Magnesium salts, if present at too high a concentration, will give rise to unpleasant bitter flavours and may cause spoilage during the salting operation.

When only impure salt is available, most of the calcium and magnesium impurities can be washed away by using rain or fresh clean water and draining off wash water. This practice will remove calcium and magnesium salts which are highly soluble.

5.4.4.3 DURING DRY-SALTING CEPHALOPODS SHOULD BE KEPT AT A TEMPERATURE BELOW 3°C (37.4°F) SMF 4.4.3.6/Mod

Dry-salting should always be done in a chill-room temperature, if not, yeasts which survive in sugar may cause abnormal fermentation in forming acids and alcohols. Dry-salted cephalopods should be thoroughly covered by the juice exuded from the cephalopods to prevent rancidity, discoloration, and off-flavour and to give taste.

5.4.4.4 IMMEDIATELY AFTER DRY-SALTING, CEPHALOPODS SHOULD BE SUSPENDED ON RODS (TENTERS) OR HOOKS, OR LAID OUT ON TRAYS FOR DRYING SMF 4.4.3.9/Mod

After dry-salting, excess dry-salting compound should be removed and cephalopods should be subjected to drying which should be carried out in an open area or in a mechanical dryer under controlled conditions. For this reason and for the purpose of subsequent smoking or processing, the cephalopods should be suspended on rods, hooks or laid out on trays. Care should be taken to ensure that the suspended cephalopods do not touch each other, otherwise they will be unevenly dried and damaged physically during the separation.

5.4.4.5 DRYING OF CEPHALOPODS PRIOR TO SUBSEQUENT PROCESSING SHOULD BE CARRIED OUT UNDER CONTROLLED CONDITIONS AND IN A HYGIENIC MANNER SMF 4.4.3.10/Mod

Drying of cephalopods after the dry-salting refers to the removal of the adhering surface water and evaporation of the surface moisture. If it is done properly, the formaton of a glossy pellicle will result. The pellicle is important because it helps to seal in the natural juices and flavours of the cephalopod meats and forms a smooth and attractive surface.

Drying of cephalopods may be done outdoors providing there is no chance for contamination by insects, birds and dust, or in the smoke house. An ideal system is in the chill room with the aid of a blower where a steady current of cool, clean air could be provided.

5.4.4.6 IF FOOD PRESERVATIVES ARE USED THEY SHOULD BE OF A TYPE APPROVED BY THE OFFICIAL AGENCY HAVING JURISDICTION SMF 4.4.3.11/Mod

Only approved food preservatives should be added to the brine or applied after brining. Dissolved food preservatives should not be applied to the surface of the smoked product as this will tend to spoil the appearance.

5.4.5 Smoking

5.4.5.1 FOR SMOKE PRODUCTION, THE WOOD, WOOD SHAVINGS OR SAWDUST SHOULD BE DRY AND FREE FROM SOIL DUST AND HARMFUL SUBSTANCES SUCH AS WOOD PRESERVATIVES AND PAINT SMF 4.4.4.1/Mod

Soft resinous woods give the product an acrid unpleasant taste.

The best combustion temperatures for the wood are in the range of 250-350°C (482-662°F). Temperatures of more than 400°C (752°F) are to be avoided because of the development of undesirable components in the smoke.

The smoking of cephalopods is carried out at 20-25°C (68-77°F) for the initial 1-2 h at 50-60°C (122-140°F) for the succeeding period, and at 60-70°C (140-158°F) for the final 2-3 h. It requires about 7-9 h to obtain good results.

Wet or mouldy sawdust should not be used; however, depending on the type of wood and the nature of the operation, it may be desirable to use damp sawdust. It is a bad practic to use water during the smoking operation for damping the fire in an attempt to regulate the rate of sawdust burning.

5.4.5.2 ASH DERIVED FROM BURNING WOOD OR SAWDUST SHOULD BE PREVENTED FROM BEING DEPOSITED ON THE PRODUCT SMF 4.4.4.2

It is important, therefore, that the current of air passing the burning wood or sawdust is not so fast that it carries burned particles (ash) into the kiln. Ash should not be allowed to accumulate in large amounts in the boxes where smoke is generated.

The use of smoke scrubbers for the removal of fly-ash, soot and tars is recommended. It may be necessary to re-circulate the scrubbing water which rapidly becomes saturated with the lighter fractions which impart the desired smoke flavour, **however use of carbon or coke filters will not remove as much flavour as will water scrubbers. Colour development of the product might be affected.**

5.4.5.3 IN PREPARATION FOR SMOKING, CARE SHOULD BE TAKEN TO ARRANGE THE CEPHALOPODS ON TENTERS, HOOKS OR ON TRAYS IN SUCH A MANNER AS TO PROVIDE FOR UNIFORM SMOKE ABSORPTION, TEMPERATURE EXPOSURE AND DEHYDRATION SMF 4.4.4.4/Mod

Cephalopods should be hung or laid out on trays without overcrowding and touching each other.

Trays or screens used for laying out cephalopods will occasionally imprint a distinct design on one side of the product. In certain products, such a design might add to the appearance of the cephalopods, otherwise screens should not be used if the cephalopods can be hung. Trays and screens used in smoking should be clean and greased with food grade vegetable oil or should be coated with teflon or another suitable release agent approved by the official agency having jurisdiction.

In traditional kilns, the position of cephalopods in relation to fire should be changed frequently. The same requirement will also apply to mechanized kilns where electric fans are used and where cephalopods are located directly in front of the air/smoke inlet. If no remedial action is taken a distinctly darker colour, a bitter tarry taste and a tougher texture will result.

To obtain even smoking and dehydration of the cephalopods in the same batch, the cephalopods should be of reasonably uniform size and weight.

5.4.5.4 IMMEDIATELY AFTER SMOKING AND PRIOR TO FURTHER PROCESSING OR PACKAGING, THE WARM PRODUCTS SHOULD BE COOLED TO AN AMBIENT TEMPERATURE OR LOWER SMF 4.4.4.8/Mod

When smoking is finished, the resulting product should be cooled thoroughly before it is further processed, otherwise it will turn flabby, moist and sour or mouldy.

Cooling can be conducted in an ambient temperature or in a chill room, providing the humidity is not too high and there is a continual movement of clean, cool air or the kiln itself can be used for cooling at the end of the working day if it is equipped with cooling coils.

In large operations, air blast chilling tunnels, capable of accommodating full trolleys and operating at 0°C (32°F), can be used.

The ash from burning wood or sawdust or any other impurities deposited on the surface of smoked cephalopods should be wipped off with a clean cloth or brush.

5.4.5.5 SEASONING OF SMOKED CEPHALOPODS SHOULD PREFERABLY BE DONE IN A STAINLESS STEEL ROTARY MIXER

Smoked or roasted cephalopods, which are either split or cut up into relatively fine rings, are sprayed with the water solution of sugar, salt and spices, and then are placed into a stainless steel rotary mixer where, through agitation, a thorough and uniform distribution of seasoning liquor takes place.

5.4.5.6 IN CASE OF A FIRE IN A MECHANICAL KILN, THE FANS SHOULD BE SWITCHED OFF AND ALL DAMPERS CLOSED. ALL OTHER SUPPLIES OF ELECTRICITY TO THE KILN SHOULD ALSO BE TURNED OFF SMF 4.4.4.10/Mod

There is a serious fire hazard if the kiln is allowed to become coated with a fatty condensate from the smoke. If a fire occurs the outside of the kiln should, as far as possible, be kept cool by spraying water. The fire inside should be fought by the injection of carbon dioxide into the closed kiln.

5.4.6 Packaging, Storage and Distribution

5.4.6.1 PACKAGING MATERIALS SHOULD BE CLEAN AND STORED IN A HYGIENIC MANNER. PACKAGING SHOULD BE CARRIED OUT UNDER CONDITIONS THAT PREVENT CONTAMINATION OF THE PRODUCT FF 5.4.3.14/Mod

Packaging materials used for processed cephalopod products should not transfer to the products any objectionable or harmful substances or odours and flavours and should protect the products against damage, deterioration and contamination.

5.4.6.2 PROCESSED CEPHALOPOD PRODUCTS WHICH ARE NOT FROZEN, SHOULD BE PACKED FOR TRANSPORT SO THAT THERE IS NO DIRECT CONTACT WITH ICE OR MELT WATER SMF 4.4.5.4/Mod

Prolonged contact with ice or melt water will result in the discoloration, leaching away of flavour and colour, softening of the texture and in general deterioration of the product.

Ice packed in the same container with cephalopods, but not in direct contact with them, is still the most common method of maintaining a chilled condition during transport.

Wet-strength paper or plastic film should be used to wrap the products and separate them from ice. Dry ice or pre-chilled eutectic solutions, in plastic or metal containers, can be used in master cartons having good insulation.

5.4.6.3 BOXES CONTAINING PROCESSED CEPHALOPOD PRODUCTS SHOULD BE HANDLED VERY CAREFULLY DURING TRANSPORT AND DISTRIBUTION. THEY SHOULD NEVER BE UP-ENDED FF 5.4.3.16/Mod

In some areas boxes may be handled and stacked many times during distribution. Handling practices are often very rough, due to shortage of time at transfer points and use of outdated methods for handling large quantities of boxes. Boxes should never be up-ended as this can result in physical damage to the product.

5.5 Sanitary Control Programme

5.5.1 IT IS DESIRABLE THAT EACH CEPHALOPOD PROCESSING PLANT IN ITS OWN INTEREST DESIGNATES A SINGLE INDIVIDUAL, WHOSE DUTIES ARE PREFERABLY DIVORCED FROM PRODUCTION, TO BE HELD RESPONSIBLE FOR THE CLEANLINESS OF THE ESTABLISHMENT FF 5.5.1/Mod

Such a person or his staff should be a permanent part of the organization or employed by the organization and should be well trained in the use of special cleaning tools, methods of dismantling equipment for cleaning and in the significance of contamination and the hazards involved. A permanent cleaning and disinfection schedule should be drawn up to ensure that all parts of the establishment are cleaned appropriately and that critical areas, equipment and material are designated for cleaning and/or disinfection daily or more frequently if required.

5.6 Laboratory Control

5.6.1 IN ADDITION TO ANY CONTROL BY THE OFFICIAL AGENCY HAVING JURISDICTION, IT IS DESIRABLE THAT EACH CEPHALOPOD PROCESSING PLANT IN ITS OWN INTEREST SHOULD HAVE ACCESS TO LABORATORY CONTROL TO ESTABLISH QUALITY OF THE PRODUCTS PROCESSED FF 5.6.1/Mod

The extent and type of such control will vary with the food product, as well as the needs of management. Such control should reject all foods that are unfit for human consumption.

Analytical procedures used should follow recognized standard methods in order that the results may be readily interpreted.

6. SECTION V - END PRODUCT SPECIFICATIONS Crb 6/Mod

6.1 Appropriate methods should be used for sampling and examination to determine the compliance with the following specifications:

A. Cephalopods or cephalopod products should be, to the extent possible in good manufacturing practice, free from objectionable matter and parasites;

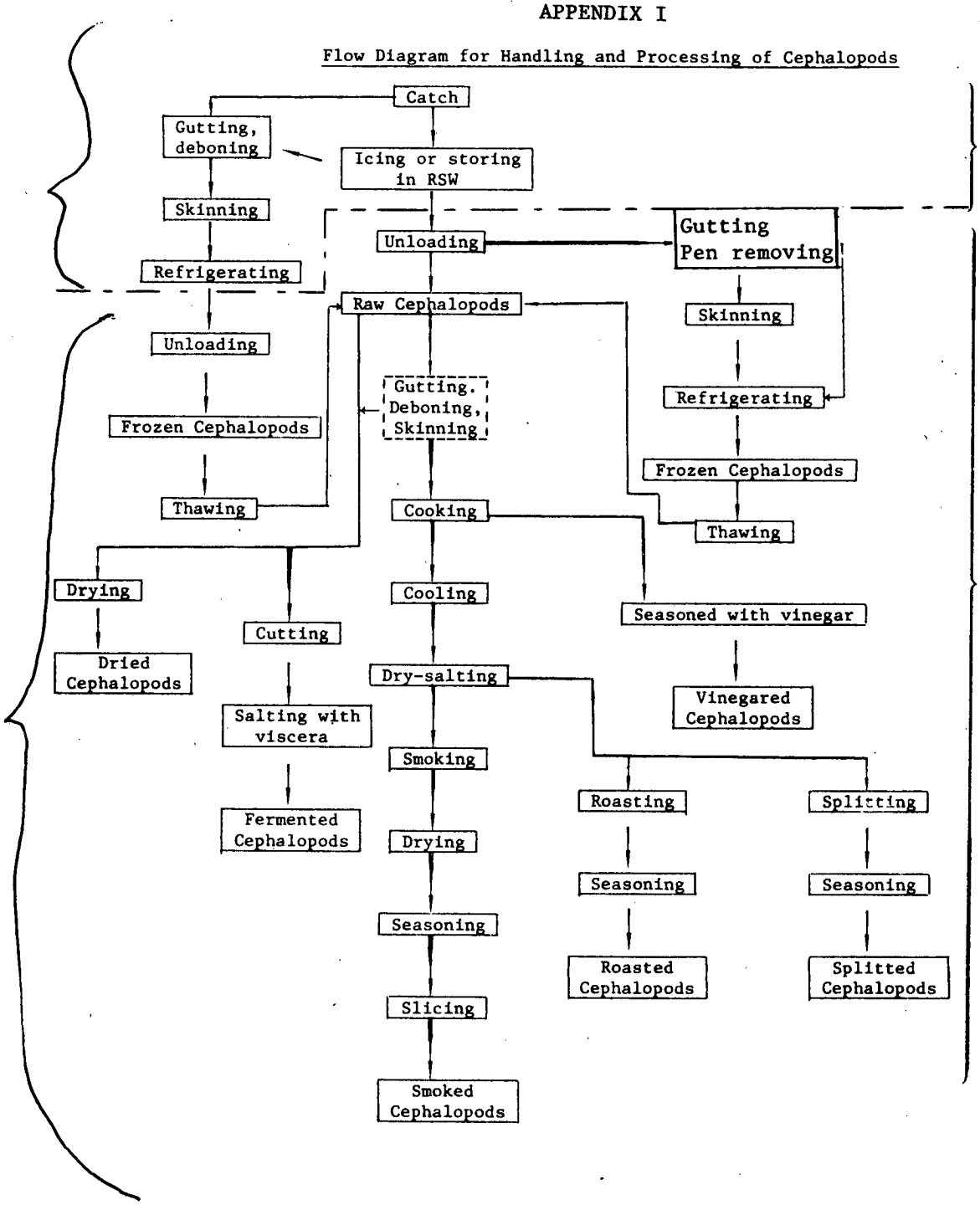
B. Cephalopods or cephalopod products should be free from micro-organisms in amounts harmful to man, free from parasites harmful to man and should not contain any substances originating from micro-organisms in amounts which may represent a hazard to health;

C. Cephalopods or cephalopod products should be free from chemical contaminants in amounts which may represent a hazard to health;

D. Cephalopods or cephalopod products should comply with any requirements set forth by the Codex Alimentarius Commission on pesticide residues and food additives as contained in permitted lists or Codex commodity standards, or should comply with the requirements on pesticide residues and food additives of the country in which the cephalopods will be sold.

APPENDIX I

Flow Diagram for Handling and Processing of Cephalopods



APPENDIX II

References to Related Codes and Standards

Recommended International Code of Practice for Fresh Fish	CAC/RCP 9 - 1976
Recommended International Code of Practice for Canned Fish	CAC/RCP 10 - 1976
Code of Practice for Shrimp and Prawns	CX/FFP 77/7 (FAO Fish.Circ., No.C322 Rev. 1)
Code of Practice for Lobsters and Related Species	CX/FFP 76/16 (FAO Fish.Circ., No. 330)
Code of Practice for Smoked Fish	CX/FFP 77/6 (FAO Fish.Circ., No.C321 Rev.1)
Code of Practice for Crabs	FAO Fish.Circ., (349):49 pages 1977
International Standards for Drinking Water	(WHO) Third edition, 1971
Code of Practice for Frozen Fish	CX/FFP 77/16 (FAO Fish.Circ., No.C145 Rev.1)

CONSIDERATION OF THE FEASIBILITY OF DEVELOPING A CODE OF PRACTICE FOR AQUACULTURE

(Prepared by USA)

The Codex Alimentarius Commission, 16th Session, July 1-12, 1985, Geneva, approved new work to be undertaken by the Codex Committee on Fish and Fishery Products. This document addresses the Feasibility of Developing A Code of Practice for Aquaculture.

Aquaculture (Defined):

Aquaculture may be defined as everything concerned with the cultivation of marine and freshwater species of fish and shellfish, crustaceans, mollusca, algae and any other plant or animal reared or cultivated in fresh or salt water.

Note: Consideration should be given to the division of this definition into Aquaculture and Mariculture.

Background:

The practice of fish farming has been in existence for centuries. As the strain on global fishery resources increase and as fish and fishing products become more acceptable to consumers of countries with a low per capita intake, there is no doubt that fish farming will increase. There is a need to establish a uniform code of practice for production of fish and fishery products for human consumption.

Commonly Used Species:

Tilapia, carp, trout, catfish, shrimp, crayfish, redfish, salmon, oysters, and tuna.

Rearing Quarters:

Cages, pens, ponds, lakes, reservoirs, rivers, bays, and estuaries.

Points to Consider:

I. Environmental Quality.

A. Water - adequate source

1. Temperature
2. Turbidity
3. Absence of contamination

a. xenobiotics
b. metals
c. bacteria (disease causing - epizootic)
d. parasites
e. other fish
f. odors
g. extraneous material (algae - off flavor in product)

4. Salinity
5. pH
6. Aeration
7. Aquaculture/agriculture relationship - proximity

Note: Holding facilities for rearing are in some cases dictated by regulations such as cage size in Norway. It has been found desirable in the U. S. Southwest to have pond bottoms perfectly flat (determined by laser equipment) for ease of harvest. Holding facilities and harvesting equipment should be designed to prevent minimum damage to the final product.

III. Stock Quality

A. Brood Stock

1. Disease free with certification
2. Adequate and proper nutrition
3. Genetically healthly
4. Reliable and adequate supplier

B. Fry

1. Disease free with certification
2. Adequate and proper nutrition
3. Genetically healthly
4. Reliable and adequate supplier
5. Proper transporting

a. aeration
b. temperature
c. proper population (no overcrowding in transit)
d. minimum transit time

III. Feed Quality

A. Absence of contamination

1. Free of anthropogenic and natural contaminants
2. Microorganisms

a. Salmonellae

3. Xenobiotics

a. cross contamination
b. accidental

4. Mold

a. aflatoxin

5. Unapproved drugs
6. Rancidity

B. Quality

1. Nutritionally adequate
2. Reliable source

a. commercial (certified)
b. self (with proper controls)

C. Medicated

1. Approved drugs to control disease and parasites
2. Approved growth stimulators

IV. Ethical obligations

A. Disease outbreaks

1. Quarantine

Note: In the event of an epizootic, affected product should be withheld from consumer channels.

ALINORM 87/18
APPENDIX IX

OBJECTIVE METHODS OF DETERMINING THE FINAL QUALITY OF SALTED HERRING (Salt Content Minimum 11 Per Cent In Fillets) DURING PROLONGED STORAGE

Proposed Annex to Code of Practice for Salted Fish
(prepared by Finland)

CONTENTS

1. INTRODUCTION
2. MONITORING OF PRODUCT QUALITY
- 2.1 Sensory evaluation
- 2.2 pH of brine
- 2.2.1 Specifications
- 2.2.2 pH determination
- 2.3 Salt content of fish
- 2.3.1 Specifications
- 2.3.2 Determination of salt content
- 2.4 Microbiological specifications
- 2.4.1 Sampling, microbiological limits
- 2.4.1.1 Mesophilic aerobic bacteria
- 2.4.1.2 Levan- and dextran-forming bacteria
- 2.4.2 Methods for the microbiological analysis of salted fish and brine
- 2.4.2.1 Mesophilic aerobic bacteria
- 2.4.2.2 Levan- and dextran-forming bacteria
- 2.5 Content of histamine in fish
- 2.5.1 Specifications
- 2.5.2 Determination of histamine content

3. CONTROL OF FACTORS AFFECTING THE AMOUNT OF EDIBLE PART OF THE FISH
- 3.1 Weight of fish
- 3.2 Uniformity of fish size
- 3.3 Amount of spawn and intestines

DETECTION OF LEVAN- AND DEXTRANFORMING BACTERIA

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1. INTRODUCTION

Besides being consumed directly as a food, salted herring is used to a great extent as a raw material in the fish industry. The ripening time and consequent prolonged storage of such cured fish may vary from one to twelve months or more. It is common that during this time the processor sells the salted fish to the industry for the production of semipreserved fish products. Weight, product quality, and balance between salt, sugar and other ingredients vary during the storage period. Due to these factors and the commercial value of salted fish, which is often considerable, it is important to monitor its condition during storage. Failure to do so will probably result in loss of quality and increased risk of spoilage. Furthermore, through careful monitoring the most suitable use of the salted fish can be ascertained.

The criteria presented in Section 2 of this Annex, including the methods, empirically indicate good product quality of salted herring during prolonged storage.

The parameters mentioned in Section 3 are not directly associated with processing technology, but they affect the amount of the edible part of the fish and are important in the further use of the salted fish. Consequently they should be determined.

2. MONITORING OF PRODUCT QUALITY

2.1 Sensory evaluation

Fish and brine shall have a good characteristic odour and flavour and shall be free from objectionable odours and flavours of any kind.
Sensory assessment of salted herring shall be made only by persons trained in such assessment.

2.2 pH of brine

2.2.1 Specifications

The appropriate pH value of salted fish may vary according to the process applied, optional ingredients of brine (e.g. sugar) etc. Too high a pH value indicates a deterioration of the fish. The pH of brine should be in the range of 5.6 - 6.3.

2.2.2 pH determination

Set up and adjust a pH meter and the glass and calomel electrodes according to the manufacturer's operating instructions for use at 20°C. Calibrate the instrument with a standard buffer solution of pH 5.0 - 7.0 at 20°C. Rinse the electrodes free of buffer solution with plenty of distilled water. Immerse the electrodes in the sample tempered to 20°C contained in a beaker. Read the pH to the nearest 0.1 unit.

2.3 Salt content of fish

2.3.1 Specifications

A sufficient salt (NaCl) content in cured fish is important to prevent microbial spoilage and autolytic decomposition during prolonged storage. The salt content in cured fish varies according to the ratio of salt to fish and the time in cure. The salt content should be not less than 11% in skinless herring fillet.

2.3.2 Determination of salt content

Salt is determined by titration. Reference: Official Methods of Analysis of the Association of Official Analytical Chemists, 13th Edition, Sections 18.034 and 18.035.
25 ml 0.1 N $AgNO_3$ is equivalent to 146.25 mg NaCl, corresponding to 1.2 g muscle, if the salt content is 12%, and 0.97 g muscle, if the salt content is 15%.

2.4 Microbiological specifications

2.4.1 Sampling, microbiological limits

2.4.1.1 Mesophilic aerobic bacteria

Mesophilic aerobic bacteria should not be recovered in any of the 5 fish sample units examined, when the test is carried out according to the method described, in a number exceeding 10^5 per g, nor in a number exceeding 10^4 per g in 3 or more of the 5 sample units examined ($n = 5$, $c = 2$, $m = 10^4$, $M = 10^5$).

2.4.1.2 Levan- and dextran-forming bacteria

If sugar has been added to the brine, there is a risk of levan and dextran formation in the presence of levan- and dextran-forming bacteria. Therefore these bacteria should not be found in any of the 10 brine sample units examined, when the test is carried out according to the appended method ($n = 10$, $c = 10$, $m = 0$).

2.4.2 Methods for the microbiological analysis of salted fish and brine

2.4.2.1 Mesophilic aerobic bacteria

Refer to ICMSF (1974) chapter 8, page 92 for collection and preparation of samples for analysis. The standard plate count agar contains 8% NaCl. Incubation of agar plates is at 30°C.

2.4.2.2 Levan- and dextran-forming bacteria

The presence of levan- and dextran-forming bacteria is determined according to the appended method.

2.5 Content of histamine in fish

2.5.1 Specifications

High content of histamine indicates a deterioration of fish. Content of histamine in fillets should not exceed 200 mg/kg.

2.5.2 Determination of histamine content

Content of histamine is determined by an appropriate method. Reference methods:

a) Official Methods of Analysis of the Association of Official Analytical Chemists, 13th Edition, Sections 18.067 - 18.071.
b) Nordic Committee on Food Analysis. N:o 99/1981.

3. CONTROL OF FACTORS AFFECTING THE AMOUNT OF THE EDIBLE PART OF THE FISH

3.1 Weight of fish

The weight of the fish is determined before salting has commenced and after prolonged storage.

For the determination of weight before salting has commenced, the fish is cleaned, rinsed and drained. The weight is determined according to the method described for fish prepared for salting.

The weight of the fish after prolonged storage is determined after the salt-liquid equilibrium between fish and brine has been reached, that is not less than four weeks in cure, according to the method described.

For the determination of drained weight, the fish plus rinse-water are poured into a pre-weighed sieve. The fish is allowed to drain ten minutes, measured from the time it is poured into the sieve.

The sieve containing the drained fish is weighed. The weight of the sieve is subtracted from that of the sieve plus fish to give the drained weight of the fish.

For complete drainage the temperature of the fish should not be below + 8°C.

If the weight of the fish in the container is less than 10 kg a sieve of diameter 30 cm should be used. For 10-100 kg or more, a 100 cm sieve should be used. The woven-wire sieve mesh should have square openings of 5 mm by 5 mm or 10 mm by 10 mm, respectively.

3.2 Uniformity of fish size

The uniformity of fish size is of importance for the processor in the selection of raw material for different products.

The uniformity of fish size, expressed as the number of fish in one kg of drained product, is given by the following equation:

$$\frac{n}{m_d}$$

where

n = number of fish in container

m_d = drained weight in kg as determined in 3.1

The uniformity of fish size can also be determined by counting the number of fish in a container and expressing the results as the number per container (usually 100 kg). For indicating the number it is better to use a fish size classification, e.g. 300-500 fish per container (100 kg), 500-700 per container, and over 700 per container.

3.3 Amount of spawn and intestines

The amount of spawn and intestines affects the amount of the edible part of the fish and is of commercial importance. It should be measured once, in the following way.

Salted fish or fish prepared for salting are drained according to the method described in 3.1 and weighed. The spawn and intestines are removed from the fish and weighed; the weight is expressed as a percent of the total weight of the fish.

DETECTION OF LEVAN- AND DEXTRAN-FORMING BACTERIA

1. SCOPE

A method for the detection of levan- and dextran-forming bacteria in salted fish; refers to section 2.3.2.2 in the annex "Objective methods of determining the final quality of salted herring (salt content minimum 11 percent in fillets) during prlonged storage".

2. FIELD OF APPLICATION

The method can be applied to salted fish covered by the Code of Practice for Salted Fish.

3. DEFINITIONS

3.1 Micro-organisms

By "levan- and dextran-forming bacteria" is meant micro-organisms which form slime in sucrose containing solid media.

3.2 Detection

By "Detection" is meant the determination of the presence or absence of these micro-organisms in a particular sample when the test is carried out according to the method described.

4. PRINCIPLE

The detection of levan- and dextran-forming bacteria requires two successive stages: plating-out and, if required, confirmation.

4.1 Plating-out

Inoculation of the brine onto solid salt- and sugar-containing media which, after incubation at 30°C, are examined for the presence of colonies. Slimy colonies are considered presumptive levan- and dextran-forming bacteria.

4.2 Confirmation

If the result from 4.1 is negative the plating-out of the brine is repeated after two weeks.

5. CULTURE MEDIA

5.1 Nutrient agar

5.1.1 Composition

Yeast extract	5 g
Tryptone	10 g
Sodium chloride	100 g
Sucrose	100 g
Agar	15 g
Potassium dihydrogen phosphate (KH_2PO_4)	2 g
Water	1000 ml

5.1.2 Preparation

Dissolve yeast extract, tryptone, sodium chloride, sucrose, potassium dihydrogen phosphate and agar in the water by boiling.
Adjust the pH so that after sterilization it will be 7.0 ± 0.1 at 20°C.
Sterilize the medium for 15 min. at 121 ± 1°C.

Add to large (diam. 140 mm) and small (diam. 90 mm), sterile Petri-dishes, about 50 ml of the freshly-prepared complete nutrient agar and allow to solidify. Use only freshly prepared plates, which are dried at 55°C for 20 min. prior to use.

6. APPARATUS AND GLASSWARE

6.1 Apparatus

6.1.1 Apparatus for sterilization of glassware, culture media etc.

6.1.2 Incubator having automatic moisture control, or with water trays, for maintaining the inoculated plates at 30°C.

6.2 Glassware

6.2.1 The glassware shall withstand sterilization.

6.2.2 Culture flasks for sterilization and storage of culture media.

6.2.3 10 ml graduated pipettes, 100 ml measuring cylinder.

6.2.4 Petri-dishes internal diameter 90 mm and 140 mm, external height minimum 18 mm. Dishes of other dimensions may be used.

6.3 Sterilization of glassware etc. Use one of the following methods:
wet sterilization at not less than 121°C for 15 min.,
dry sterilization at not less than 170°C for 1 h.

7. SAMPLING

Use 100 g samples of pickle or brine.

8. PROCEDURE

The pickle samples must be mixed thoroughly before the subsamples are withdrawn for dilution series for plating.

8.1 Plating out

Inoculate the brine sample onto solid agar plates (5.1). Use 1.0 ml of sample for large Petri-dishes and thereafter 0.1 ml of sample dilution for small Petri-dishes. Incubate 5 days at 30°C, and examine for the presence of colonies of levan- and dextran-forming bacteria.
A slime colony adheres to the tip of a platinum loop as it is brought into contact with the colony and then withdrawn.

8.2 Confirmation

If the result from 8.1 is negative the plating-out is repeated as described in 4.2.

9. EXPRESSION OF RESULTS

If levan- and dextran-forming bacteria are not detected after 8.1 and 8.2, report: "No levan- and dextran-forming bacteria detected in the sample(s) examined".

If levan- and dextran-forming bacteria (8.1) are detected after 8.1 and 8.2, report: "Levan- and dextran-forming bacteria detected in the sample(s) examined".

10. TEST REPORT

Indicate the method of test by quoting this Reference Method.

The test report must give the information needed for complete identification of the sample.

CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

Oslo, 5th - 9th May 1986

METHODS OF ANALYSIS - WORKING GROUP

In line with the request from the Codex Committee on Methods of Analysis and Sampling, the Committee established a working group to clarify methods of analysis described in their existing and draft standards. The working group met on 5th and 6th May 1986. Those present were:

K.J. DALE	United Kingdom	Chairman
R. BOURQUE	Canada	
R. BIRCH	Denmark	
C. SIMONNET	France	(5th May 1986)
J. OEHLENSCHLAGER	Germany - Federal Republic of.	
G. HALLGRIMSDOTTIR	Iceland	(5th May 1986)
G. VALDIMARSSON	Iceland	(5th May 1986)
N. LOSNEGARD	Norway	
O. BINDSCHEDLER	Switzerland	(5th May 1986)
R. KIRK	United Kingdom	
K. IWAMOTO	United States of America	
I. TURNER	United States of America	

The working group considered the methods of analysis in both the existing and draft fish and fishery products standards. The attached annex indicates the classification the group would recommend the Committee to accept.

The working group recognised that at some future date it will be necessary to review all standards to ensure that relevant methods of analysis appear in the appropriate section in each standard and at suitable invertale assess the validity to the actual methods in order to recommend amendments to keep abreast of developments.

The working group recommends that when methods of analysis are added to draft standards, the Committee should note the appropriate classifications.

ANNEX

METHODS OF ANALYSIS

STANDARD	METHOD	CLASSIFICATION
Canned Pacific Salmon 3 - 1981	Vacuum Test - Ordinary	3
	" " - Special	1
Gutted Pacific Salmon 36 - 1981	NIL	-
Canned Shrimps or Prawns 37 - 1981	Drained weight - Liquid Pack	1
	" " - Gelled Pack	1
	Size (Count per unit weight)	1
	Water Capacity of Container	1
Quick Frozen Fillets of Cod and Haddock 50 - 1981	Glaze	1
Quick Frozen Fillets of Ocean Perch in Water or Oil 51 - 1981	Glaze	1
Canned Tuna and Bonita in Water or Oil 70 - 1981	Net Contents	1
Canned Crab Meat 90 - 1981	Net Contents	1
	Drained Weights	1
	Water Capacity of Container	1
Quick Frozen Fillets of Flat Fish	Net Contents for products covered by glaze	1
Quick Frozen Shrimps or Prawns 92 - 1981	Net Contents for products covered by glaze	1
Canned Sardines and Sardine - Type Products 94 - 1981	Net Contents	1
Quick Frozen Lobsters 95 - 1981	Net Contents for products covered by glaze	1
Canned Mackerel and Jack Mackerel 119 - 1981	Net Contents	1
	Drained Weight - own juice etc	1
	- Sauces etc	1
	Water capacity of Container	1

Draft Standards

STANDARD	METHOD	CLASSIFICATION
Quick Frozen Blocks of Fish Fillets, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh	Net Contents for products covered by glaze	Method to be developed.
	Proportion of fillets	"
	Presence of Parasites (Candling)	1
Quick Frozen Fish Sticks and Fish Portions - Breaded or in Batter	Fish Flesh Core	1
Dried Salted Fish	NIL	-

PROPOSAL FOR REVISED VERSION OF THE RECOMMENDED INTERNATIONAL CODE OF PRACTICE FOR SHRIMPS AND PRAWNS TO INCLUDE HACCP NOTES

(Prepared by U.S.A.)

Explanatory paragraph

While the recommended international codes of practice for various fishery products contain both hygienic and technological considerations in producing and manufacturing specific commodities, there appears to be merit to revise the codes to more specifically detail the critical control points (CCP) in the codes, accompanied with explanatory CCP notes describing the risk and giving the type and frequency of controls to be applied. Such similar code revision has received attention of the Codex Committees responsible for processed meat and poultry products and mass catering. These revisions were accomplished by employing the hazard analysis critical control point (HACCP) system consisting of:

(1) an assessment of hazards associated with growing, harvesting, processing/manufacturing, marketing, preparation and/or use of a given raw material or food product; (2) determination of critical control points required to control any identified hazard(s); and (3) establishment of procedures to monitor critical control points.

Notwithstanding the aforementioned, proper implementation of a HACCP system can only be accomplished through trained inspectors and personnel, working within an adequate sanitary institution. Finally, it is well recognized that when developing a HACCP system for a specific commodity, recognition must be given on the need to avoid precluding the adoption of new technological developments which are consistent with the hygienic production of the commodity, while at the same time, exercising sufficient care to insure that the new technological development itself does not create hazards to health, such as vacuum packaging or modified atmosphere packing of fishery products to be held for extended times at refrigerated temperatures only.

The proposed revisions to the International Code of Practice for Shrimps or Prawns contain suggested critical control point (CCP) notes for inclusion into the code. These suggested CCP notes are not meant to be all inclusive and are for introduction and discussion purposes. The suggested CCP notes are taken from wording suggested for the draft code of hygienic practice for processed meat and poultry products and the proposed draft code of hygienic practice for pre-cooked and cooked foods in mass catering.

The following are those suggested CCP notes for inclusion into the recommended International Code of Practice for Shrimps and Prawns at the end of the indicated paragraphs.

Handling Shrimp at Sea

4.1.1 General Considerations

4.1.1.1

CCP Note: Cross-contamination is an important factor that contributes to foodborne outbreaks. Food can be contaminated with harmful organisms after cooking sometimes from a food handler, but much more often directly or indirectly from raw food. Therefore, a good separation of the different processing steps is necessary.

4.1.3 Hygiene Facilities

4.1.3.2

CCP Note: This provision is intended to cover water for both cleaning purposes and the destruction of micro-organisms (especially those pathogenic to man), on knives, utensils, etc., coming into direct contact with unprepared and prepared food. For cleaning purposes the temperature of the water used will depend upon the type of soil to be removed (for details see Annex I of the General Principles of Food Hygiene, CAC/VOL A - Ed. 1). The hot water for disinfection purposes should be maintained at least 80°C and frequently changed and dispensed in such a way (e.g. in specially designed boxes near the working area) that blades of knives etc. can be submerged in the water for an adequate contact time (no less than two minutes).

Often this water supply is separate from hot water supplies used for cleaning, hand-washing etc. But if there is only one hot water supply the term "adequate" should mean adequate as described above even at times where large amounts of hot water are used. During cleaning operations the water supply from any tap in the establishment should not be decreased.

4.1.3.3

CCP Note: Samples should be taken regularly, but the frequency should depend upon the origin and the usage of the water. When chlorination is employed, checks should be made daily by chemical tests for available chlorine. The point of sampling should preferably be at the point of usage.

4.2 Equipment and Utensils

4.2.5

CCP Note: Only properly designed equipment is satisfactory for bulk cooking at sea. Merely increasing the size or quantity of traditional equipment employed in shoreside facilities is generally not satisfactory. The design, capacity, and installation of cooking equipment aboard vessels must be adequate to permit the hygienic production of shrimp and guard against possible cross contamination of the cooked product from raw materials.

4.3 Hygienic Operating Requirements

4.3.7

CCP Note: Contamination of cooked ready-to-eat products represents a most serious health threat. Shrimp can be contaminated with harmful micro-organisms after cooking sometimes from a food handler. Moreoften, however, such post processing contamination is from either direct/indirect contact with raw product or unsuitable water.

4.3.8

CCP Note: The purpose of cleaning and disinfection at the conclusion of each working day is to hinder building-up of an undesirable, possibly pathogenic micro-flora in the establishment. Monitoring should be done by regular inspection.

4.3.9

CCP Note: Adequate training in food hygiene procedures necessary to prevent contamination of cooked ready-to-eat shrimp are necessary to produce a safe product. The frequency should be such to ensure all personnel engaged in the cooking process are sufficiently familiar with possible food hazards and specific methods of prevention.

4.4.4 Cooking and Cooling

4.4.4.3

CCP Note: Epidemiological information indicates that one of the most important factors contributing to the occurrence of food-borne disease outbreaks is related to operations that follow cooking. For instance, if cooling is far too slow, so that any part of the food stays for a dangerously long time in the temperature range between 60°C and 10°C where harmful microorganisms grow rapidly, food safety problems can occur. Hazard analyses must assess conditions of rapid cooling.

4.4.5 Food Additives

4.4.5.2

CCP Note: Sodium bisulphite is a food additive which can be easily abused aboard vessels with personnel not trained in its proper application. A training frequency to ensure its proper use aboard vessels is necessary.

Handling Shrimp on Shore

5.1 Plant Construction and Layout

5.1.1

CCP Note: To prevent direct or indirect cross contamination of cooked shrimp with raw shrimp, a good defined separation of the different handling rooms is necessary.

5.1.3 Hygiene Facilities

5.1.3.4

CCP Note: This provision is intended to cover water for both cleaning purposes and the destruction of microorganisms (especially those pathogenic to man), on knives, utensils, etc. coming into direct contact with shrimp. For cleaning purposes a temperature of 65°C of the water is suitable (for details see Annex I of the General Principles of Food Hygiene, CAC/Vol.A - Ed. 1). For disinfection purposes hot water at 80°C for no less than two minutes could be used and dispensed in such a way (e.g. in specially designed boxes near the working area) that blades of knives etc. can be submerged in the water for an adequate contact time (no less than two minutes).

Often this water supply is separate from other hot water supplies used for cleaning, hand-washing etc. But if there is only one hot water supply the term "adequate" should mean adequate as described above even at times where large amounts of hot water are used. During cleaning operations the water supply from any tap in the establishment should not be decreased.

Water should comply with the requirements contained in the WHO "International Guidelines for Drinking Water", and in particular those concerned with microorganisms of enteric origin. Samples should be taken regularly, but the frequency should depend upon the origin and the usage of the water, e.g., usually more frequently from private supplies than from public supplies and more frequently from water used for cooling of cooked shrimp than from water used for cleaning purposes.

5.1.3.5

CCP Note: When chlorination has been employed checks should be made daily by chemical tests for available chlorine. The point of sampling should preferably be at the point of usage, but occasionally it would be useful to sample at the point of entry of the water in the establishment.

5.1.3.9

CCP Note: To ensure that no equipment or utensils need to be used for both raw and cooked or precooked foods, different handling rooms should be adequately equipped.

5.1.3.11

CCP Note: It should be the responsibility of management to arrange for easy access to hand-washing facilities, outside toilets near the working area, etc. Also management should motivate and instruct the employees in proper hand-washing. There should be adequate supervision to ensure compliance with this requirement.

5.1.3.12

CCP Note: In a shrimp establishment clothing may easily become contaminated. Besides being unaesthetic such contamination may give rise to microbial proliferation, which may adversely affect shrimp and cooked products. At the end of a shift all protective clothing should be thoroughly washed and dried.

5.3.5

CCP Note: Equipment, utensils, etc. in constant contact with shrimp will be contaminated with microorganisms, and proliferation of microorganisms on these will soon take place. This may adversely affect products handled subsequently. The purpose of cleaning and disinfection at the conclusion of each working day is to hinder the building-up of an undesirable, possibly pathogenic flora in the establishment. Monitoring should be done by regular examination, preferably aided by microbiological testing.

5.4.3 Heat Processing of Shrimp

5.4.3.3

CCP Note: Same as handling shrimp at sea, 4.3.7.

5.4.3.4

CCP Note: In most cases cooked products have been subjected to a process that will reduce its microbial count; but after heat processing, there could be a possibility for microorganisms contaminating the products. In this case microorganisms contaminating the cooked product after heat processing will lack the competition from the shrimp's "natural" flora and may proliferate quickly. Such contamination may be derived from utensils and from hands, arms, or clothing of personnel that have been working with raw materials. For that reason it is important that they take any precautions for preventing the contamination of the finished, cooked product.

5.4.3.7

CCP Note: Canned shrimp is a thermally processed low acid canned product; and if the manufacturing process is not correct, food safety hazards can occur. Therefore, competent food processing authorities must be consulted to approve scheduled processes and monitoring procedures.

5.4.6 Packaging and Distribution

5.4.6.7

CCP Note: Packaging material such as paperboard for cartons should not be assembled in rooms where exposed shrimp or products are prepared, processed, handled, packaged or stored, unless it is part of a hygienically performed automated operation.

ALINORM 87/18
APPENDIX XII

SUMMARY OF DATE MARKING COMMENTS RELATIVE TO CODEX STANDARD FOR CANNED PACIFIC SALMON

ALINORM 83/18, p. 11 para 99-104 inclusive
(CCFFP May 3-8/1982)

91. ".. because the products had a long shelf life of ten years or more, the date of minimum durability would serve no useful purpose and the consumer would be better informed if the date of manufacture was used instead."

100. ".. because of the long shelf life of these products and because there had been no demonstrations of the necessity for date marking, that there should be no provision for date marking in the present standard. This would add an unnecessary extra step in the manufacturing process and consequently extra expense to the consumer."

101. ".. The Committee noted that canned salmon was a low acid canned food where no interaction between can and content would normally take place over a period of 10-15 years. It also noted that in the revised text of the guidelines for Date Marking of Prepackaged Foods, Section 5, inspection to Codex Committees included the following:

102. "5.1 Based on a study of the nature of the food, Codex Committees shall determine the type of date marking. First consideration should be given to the date of minimum durability. If, in the opinion of the Committee, this date is not appropriate for the commodity in question, the Committee should choose other alternatives listed in Section 3 above. Finally they may decide that a date is not necessary."

103. ".. After some discussion ... decided not to include any form of date marking in the present standard."

ALINORM 83/22 p. 3 para. 13-17 inclusive.
CCFL May 19-21/82

15. Following the instructions by the Commission to give further consideration to date marking in their standards in light of the revised guidelines, Codex Committees had taken action as follows:
- CCFFP (Alinorm 83/18) had examined date marking in connection with the revised text of the standard for canned salmon.... The Committee had decided that the former product was a low acid canned food with no interaction between can and product over 10-15 years. The Committee had agreed that none of the forms of date marking would provide useful information to the consumer and had not included any form of date marking into the standard for canned salmon..."

16. "The Committee (CCFL) noted with satisfaction the action taken by Codex Committees with regard to date marking..."

ALINORM 85/22A
(CCFL March 11-18/85)

Appendix V - Draft Guidelines on Labelling Provisions in Codex Standards

4.2.4.8 Date Marking and Storage Instructions

(i) Based on a study of the nature of the food, Codex Commodity Committees should determine whether there is a need for Date Marking provisions and storage requirements.

(iii) Should a Codex Committee for exeptional circumstances determine .... that no date marking is necessary, a full justification for the proposed action should be submitted to the Codex Committee on Food Labelling.

ALINORM 85/18, p. 10 para 18 - 81 inclusive
(CCFFP May 9-11/85)

79. It was noted that at the last session of the Committee there had been a full discussion of date marking. It had been pointed out that canned salmon was a low acid canned food where no interaction between can and contents would normally occur over a period of 10-15 years, and there had been a good measure of agreement that date marking could not provide useful information to the consumer and should not be included in this standard.

80. The Committee decided to maintain the decision it had taken at its previous session not to include any form of date marking in the present standard.

ALINORM 87/18
APPENDIX XIII

VALDIMARSSON ET AL.: J. ASSOC. OFF. ANAL. CHEM. (VOL. 68, NO. 3, 1985)

FISH AND OTHER MARINE PRODUCTS

Detection of Parasites in Fish Muscle by Candling Technique

GRIMUR VALDIMARSSON, HJALTI EINARSSON,[1] and FREDERICK J. KING[2]
Icelandic Fisheries Laboratories, Skulagata 4, Reykjavik, Iceland

This study determined optimum conditions for detecting codworms in skinned cod fillets by using candling tables under commercial conditions. The best balance of factors was sought for obtaining maximum lighting conditions, reducing operator fatigue, retaining natural fillet color, and having a high contrast between parasites and fish flesh. Based on the results obtained, a recommended procedure has been adopted by AOAC.

When parasites are found in fishery products, their presence can cause a financial loss to a fish processor who should remove them even though this reduces processing yield and capacity. If they are not removed, complaints from consumers are likely. A considerable amount of time and money has been spent in searches for ways or means to reduce parasite occurrence or to remove them automatically from fish muscle; studies so far have met with little success. The only practical method to date is personal observation of fish flesh and hand-removal of any parasites found. Chemical methods for their extraction are available (1), but these methods destroy the fish flesh.

A common parasite is the codworm (*Phocanema decipiens*, also known as *Porrocaecum decipiens* or *Terranova decipiens*). It is not a worm but a nematode with a rather complicated life history. In nature, an adult nematode lays eggs in the intestinal tract of a harbor seal or a gray seal. The eggs are passed by the seal and hatch in sea water into minute larvae. These small larvae are eaten by larger invertebrates such as shrimp and other small crustaceans which, in turn, are eaten by vertebrate fish. This larval form may be passed from small fish to larger fish by predation. While in the larval form, it increases in size but it cannot mature. When a seal preys on fish that contain the larval form, the larvae then mature in the seal and start the cycle all over again.

Another worm-like parasite is the nematode *Anisakis species*, sometimes called the herring worm or *Anasakis simplex*. It, the codworm, and other nematodes have been found on occasion in most species of commercially important fish. The frequency of their occurrence is difficult to estimate accurately but it is related to the abundance of seals or whales in nearby waters. In the trade, these nematodes are most frequently associated with gadoid species such as cod, pollock, haddock, and hake.

These nematodes inhabit the intestinal tract; however, if a fish is heavily infested or if it is kept on ice for a few days before gutting, a few of the larvae may migrate into the flesh. If they are not removed by a processor, a consumer complaint is likely. Even though nematodes may survive in raw fish fillets for several days, they are killed by heating to 70°C for 7 min (2) or by freezing at −20°C for 24 h (3). Thus, if present in cooked or frozen fish flesh, they are not a public health problem (4–6); their presence is simply but definitely a matter of esthetic downgrading of quality in fish flesh.

A different kind of parasite is *Sphyrion lumpi* which is a copepod ectoparasite frequently called "buttons." It attaches itself to the skin of fish such as ocean perch (redfish) and buries its head in the flesh. It is harmless to humans but is esthetically objectionable. In the United States, the regulatory tolerance (defect action level) is not more than 3% of the fillets examined contain one or more copepods accompanied by pus pockets.

Other parasites form cysts in fish flesh, for example, in freshwater fish. The United States defect action level is 60 cysts per 100 fish (fish 1 lb or less) or per 100 lb of fish (fish over 1 lb) provided that 20% of the fish examined are infested if the fish are blue fin and other freshwater herring. For tullibees, ciscoes, inconnus, chubs, and white fish, the defect action level is 50 parasitic cysts per 100 lb (whole or fillets) provided that 20% of the fish examined are infested. Even though parasites such as these are not considered to be a public health problem if present in cooked or frozen fish flesh, their appearance is detrimental to the overall quality of edible fish.

Superficial inspection does not reveal nematode parasites imbedded in the flesh. Candling (showing a bright light through the flesh) reveals most of these parasites if present. Slicing cod fillets longitudinally into pieces that are ½ in. (13 mm) thick can increase the efficiency of detection (7). This technique may be used for fish fillets that are frozen into fish blocks but it destroys the natural appearance of fish fillets sold as such. However, candling and removal of the parasites, individually, by hand is the only method which has so far shown itself to be commercially feasible.

In an earlier study, Power (8) tested the efficiency of candling cod fillets with various values and colors of light transmitted through the cod flesh and various values of incident light. He recommended white light for transmission through a fillet and a low level of incident light to maximize detection of parasites.

In Iceland, considerable effort has been directed toward improving the efficiency of detecting and removing codworms from fillets (9). The methods presently used in Iceland for candling skinned fillets are based on a series of experiments carried out for the Icelandic Freezing Plants Corp. by Agustsson (10). The objective of these experiments was to determine the optimum lighting conditions for detecting codworms in skinned cod fillets on candling tables under commercial conditions of use, to obtain the best balance of transmitted and incident light, to keep operator fatigue to a minimum, to give as natural a color of the fillet as possible, and to give the highest possible contrast between parasites and fish flesh.

Parasites in Fish Muscle

Candling Procedure

18.A01 *Apparatus*

(a) *Candling table.*—Rigid framework to hold light source below rigid working surface of white, translucent acrylic plastic or other suitable material with 45–60% translucency. Length and width of

[1]Icelandic Freezing Plants Corp., Adalstraeti 6, Reykjavik, Iceland.
[2]National Marine Fisheries Service, Northeast Fisheries Center, Emerson Ave, Gloucester, MA 01930.

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The recommendation of the author was approved by the General Referee and Committee C and adopted by the Association. See *J. Assoc. Off. Anal. Chem.* (1985) 68, March issue.

Table 1. Detection of codworms in parasitized cod fillets by candling under different lighting conditions

Overhead illumination, lux	Total number of codworms detected at various candling light intensities (lux)			Number of fillets
	710	1800	13 000	
140	6	6	6	1
280	6	6	6	1
760	30	33	33	6

working surface should be large enough to examine entire fillet, e.g., 30 × 60 cm sheet, 5–6 mm thick.

(b) *Light source.*—"Cool white" with color temp. of 4200°K. At least two 20 watt fluorescent tubes are recommended. Tubes and their electrical connections should be constructed to prevent overheating of light source.

Av. light intensity above working surface should be 1500–1800 lux as measured 30 cm above center of acrylic sheet. Distribution of illumination should be in ratio of 3:1:0.1, i.e., brightness directly above light source should be 3 times greater than that of outer field and brightness of outer limit of visual field should be not more than 0.1 that of inner field.

Overhead illumination (indirect light) in vicinity of candling table should be ≈500 lux.

18.A02 ***Procedure***

Place skinned fish fillets in single layer on lighted working surface and examine visually for parasites. Normally, fillets are not cut into pieces before examination, but if presence of parasites is suspected, thick fillets may be cut for further examination.

Results and Discussion

During the initial testing of light sources in the candling table, 9 differently colored fluorescent tubes were tried as well as an ordinary incandescent (tungsten) light bulb. After examining several infested fillets, the inspectors concluded that a "cool white" fluorescent tube (4200°K) gave the best overall result. This conclusion is similar to that of Power (8) except that using a fluorescent tube instead of an incandescent bulb allows a larger area of uniform illumination and reduces heat output from the light source. In addition, when a candling table was fitted with two 20 watt fluorescent tubes instead of two 40 watt fluorescent tubes, the light ratio of brightness was an improvement in reducing operator fatigue.

A comparison was made of 3 different candling light intensities with 3 different conditions of overhead illumination (incident light). The results (Table 1) indicate that varying the intensity of overhead illumination between 140 and 760 lux had no effect on the ease of detection. They also suggest that a high candling light intensity of 13 000 lux does not increase the number of parasites detected compared with an intensity of 1800 lux. The fillets used were 10–20 mm thick.

Similar results were obtained upon examination of several other parasite-infested cod fillets. Although different numbers of parasites were found in different fillets, the same trends were observed in number detected in relation to different lighting conditions.

Codworms placed in fillets to a depth of 6 mm or more could not be detected regardless of candling light intensity. Power (7) found it necessary to slice large cod fillets longitudinally into slices ½ in. (13 mm) thick to increase the efficiency of candling heavily infested fillets to over 95%. Under commercial conditions, it is not practical to slice large fillets in this manner because it destroys their natural appearance and adds to the processing cost. Instead, we recommend that large fish be eviscerated as soon as possible (preferably at sea), well iced during transport, and filleted as soon as practical to reduce the potential for parasites migrating from the intestinal tract into the edible flesh. In addition, if heavily infested fish are found during processing into fillets, they are normally diverted to nonfood uses because the time and cost of removing these parasites by hand becomes uneconomical.

After the completion of the experimental work in this study, the Codex Committee on Fish and Fishery Products of the Codex Alimentarius Commission proposed draft standards for fish fillets, for fish blocks, and eventually for all fishery products in which parasites may be found (11): "Parasites or parasitic infestation detected by the candling procedure. Any parasite or parasitic infestation detectable on a 5 mm thick acrylic sheet with 45% translucency, and candled with a light source giving 1500 lux 30 cm above the sheet."

The thickness of the acrylic sheet, its translucency, and the intensity of the candling light in the Codex proposal differ slightly, but not significantly, from the conditions used in the present investigation. Recognizing that tolerances for normal production variations between different manufacturers do exist, we have added them to our proposed procedure.

On the basis of these results and observations, we recommend that the following specifications be considered to increase operator efficiency after repeated observations with optimal detection of parasites (Figure 1):

(1) The color of the light source should be "cool white" with a color temperature of 4200°K. At least two 20 watt fluorescent tubes are recommended in a candling table.

(2) The working surface on top of a candling table should be an acrylic sheet or other suitable material 5–6 mm thick with 45–60% translucency. The length and width of this sheet depend on the size of the fillets being examined and the size of the light source. A 30 × 60 cm sheet is suggested for most applications.

(3) The average light intensity above a candling table should be 1500–1800 lux as measured 30 cm above the center of the acrylic sheet.

(4) The light source should be arranged to give a distribution of illumination in a ratio of 3:1:0.1 through the acrylic sheet. In other words, the brightness directly above the light source should be 3 times greater than that of the outer field and the brightness of the outer limit of the visual field should not be more than one-tenth that of the inner field.

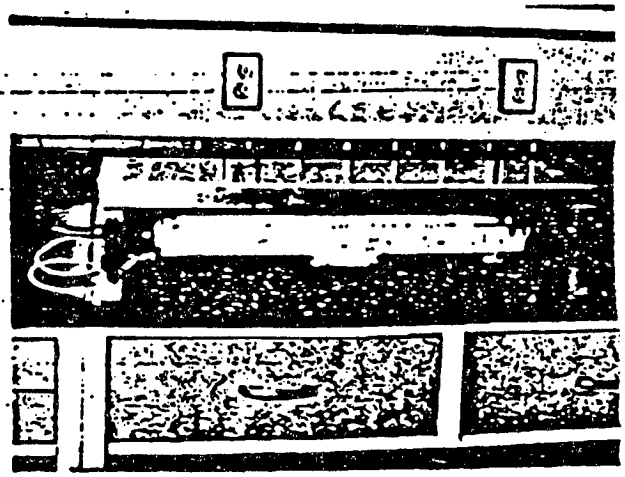


Figure 1. Candling table.

(5) The overhead illumination (incident light) should be at least 500 lux.

Our proposed procedure is based on detection of nematode parasites in fillets obtained from gadoid species of fish. These parasites and these fish species include the majority of applications for which this procedure is intended. However, comments are welcomed from interested persons who use it to detect other kinds of parasites and in other species of fish.

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(11) "The Need to Revise, Simplify, and Harmonize the Codex Standards for Quick Frozen Fish Fillets at Step 9, with Special Reference to the Defect Tables," Document Number CX/FFP/80/14 (1980), Codex Committee on Fish and Fishery Products, Codex Alimentarius Commission, FAO/WHO, Rome, Italy, 18 pp.

ALINORM 87/18
APPENDIX XIV

REPORT OF THE WORKING GROUP ON HARMONISATION OF DEFECT TABLES IN CODEX STANDARDS FOR FROZEN FISH FILLETS; FISH BLOCKS AND FISH STICKS AND PORTIONS

(CX/FFP 86/6)

1. The working group met in Bremerhaven, Federal Republic of Germany, from 28 April to 30 April 1986 under the chairmanship of Mr. H. Houwing (Netherlands). A list of those present is appended to this report.

2. The working group was welcomed to Bremerhaven by Mr. Hesse on behalf of the Federal Ministry of Food, Agriculture and Forestry, by Mr. Iden on behalf of the Senator for Economic Affairs and Foreign Trade.

3. Mr. Dunkhase of "NORDSEE" gave a presentation on current inspection procedures in the FRG and was able to demonstrate the assessment of fish blocks, including the determination of the minced fish flesh content, at the landing control laboratory at "NORDSEE". Dr. Geyer of Langnese/Iglo also explained quality control procedures to check the production of breaded and battered fish sticks and portions. Both Mr. Dunkhase and Dr. Geyer were able to support their talks with reference to actual samples and colour photographs. Additional samples of finished products were supplied by the USA.

4. Discussions were based upon the defects definitions and tables contained in Appendices III and IV of ALINORM 85/18 as well as the proposed harmonised defects tables for quick frozen fillets (Appendix VI). The group was also supplied with further documents including: comments from the Federal Republic of Germany, a report by the U.S.A. on Evaluation of Cod Fillet Blocks under Draft Codex Standards for Fish Blocks; and reports by the U.S.A. and the Federal Republic of Germany on the methodology to determine the percentage of minced fish in a mixed block of fillets and minced fish.

HARMONISATION OF DEFECTS DEFINITIONS FOR QUICK FROZEN FILLETS AND FOR BLOCKS

5. The working group first considered the definitions of defects as set out in Annex B of Appendix III and in the first column of Appendix VI of ALINORM 85/18. It was agreed that the criteria for block irregularity including deviations from dimensions, ragged edges, ice pockets etc. should apply only to blocks intended for cutting into sticks or portions.

6. Canada drew attention to the fact that ocean perch and atlantic pollock were more prone to bruising than other species and proposed specific wording to take account of this. Following discussion however, the definition of 'bruising' was adjusted only slightly. Canada was also concerned that determination of what was "objectionable" or "distinctly discoloured" would be too subjective.

7. The methods used for detecting the presence of parasites were discussed. Some countries were concerned that the use of means other than candling procedures could lead to inconsistencies in application and therefore the results would vary depending upon the sophistication of the method used. It was decided however to retain the reference to use of "any other non-destructive physical means".

8. Other decisions reached by the working group were reflected in the tables at Annex A and B to this report.

DEFECT DESCRIPTIONS AND DEMERIT POINTS

9. Discussion of the defect descriptions and the respective penalties was based upon Annex C of the draft standard for blocks and on Appendix VI at page 80 of ALINORM 85/18.

10. There was support for the opinion that there should be a more tolerant policy towards allocating demerit points for block irregularity. It would be too stringent for example to render a consignment defective if there was a deviation of just under 5 mm in the width, length or thickness dimensions. The demerit points were accordingly made less strict.

11. In order to reflect difficulties in removing scales from fillets of ocean perch, the demerit points for scaled skin-on fillets were reduced from 2 to 1.

12. The styles of different types of fillet blocks which were discussed at the last session of the Codex Committee on Fish and Fishery Products (paragraph 92 of ALINORM 85/18) had attracted several adverse comments. The working group believed that there was scope for confusion in relation to the various presentations at 2.3. The group recognised that it was virtually impossible to manufacture a fillet block which was completely boneless and decided therefore to recommend there should be no reference to such blocks in the defect tables. For the purpose of describing bone defects it was agreed to propose terminology relating to fillets and their blocks with pin bones removed (formerly style 1 and 2) and with pin bones in (formerly style 3).

13. There was considerable discussion about the appropriate penalty for each critical bone. A compromise was reached between those who regarded a block containing a critical bone as defective and others who pressed for demerit points rather than rejection of the consignment: any critical bone detected in fillets or fillet blocks with pin bones removed would make the lot defective; in fillets or fillet blocks with pin bones in such a critical bone would attract 8 points. Canada, Norway and Iceland expressed their opposition to this decision.

14. The basis for assessing the presence of fins was expanded. Besides measurements of the area covered by the fin, a fillet or block sample would be defective if the fin cluster included a critical bone i.e. greater than 40 mm in length.

15. The Federal Republic of Germany proposed additional penalties where a fillet or block sample with pin bones removed included more than 3 defect bones with reference to the recommended Hake Standard. The Federal Republic of Germany registered strong opposition when this proposal was rejected because it may allow 10-16 defect bones in "practically boneless" products.

16. The provisions relating to parasites were not changed by the Working Group despite proposals by the Federal Republic of Germany to provide for additional penalties where several parasites were discovered in the same sample unit.

The Federal Republic of Germany pointed out that they had sent written comments for consideration at the forthcoming session of the CCFFP referring to 5.1 of the draft blocks standard. This indicated that the product shall be free from objectionable matter. The Federal Republic of Germany have suggested that this should include for example a routine control on parasites during processing and removal of affected parts, independent of tolerances set out in the relevant defects table. The Federal Republic of Germany objected to the allocation of varying totals of demerit points to different species of fish as this, in their opinion, gave different weightings to the same types of defects.

17. Amendments to other aspects are reflected in the appended defects tables at Annexes A and B.

18. The UK said it was not clear to intended users of the defect tables how these should be operated. For example, there could be confusion over the appropriate sample unit (whether the whole block or a 1 kg unit). Simple instructions should be drawn up indicating that manual and/or visual inspection methods could be used. This was agreed.

19. The working group decided that a separate small defect table was appropriate for blocks of minced fish flesh. This is now at Annex C, and contains many cross references to Annex B.

ELABORATION OF A REVISED DEFECT TABLE FOR THE STANDARD FOR QUICK FROZEN FISH STICKS AND FISH PORTIONS BREADED OR IN BATTER

20. The working group based its discussions on Annexes B and C contained in Apendix IV of ALINORM 85/18 and on a proposal to harmonise these tables submitted by the Federal Republic of Germany (encl. 2 to CRD No. 5).

21. The Working Group agreed to use as a pattern the proposal of the Federal Republic of Germany. The outcome of the Working Group's deliberations have been reflected in Annex D. Sections 1,2,3 and 4 relating to defects in the final pack were deleted since they were covered in other provisions of the standard.

22. The definition of defect for ease of separation proposed by the Federal Republic of Germany was editorially amended. The Working Group decided that the defect description should be retained as in Annex C and a new category should be added to cover the range 10-20%.

23. After discussion of the proposed demerit points in the proposal of the Federal Republic of Germany the Working Group decided to retain the demerit points for 20-40% to 8 points and to allocate 4 demerit points for the 10-20% category. It was also agreed that the criteria for these defects throughout should be "cannot be separated by hand without damage" and that the defect related to the sample unit.

24. There was considerable discussion on the provision for size uniformity of the coated product and whether it should be measured by weight or by dimension. The Uk suggestion that the defect description be related to $\pm$ 20 % of the nominal weight of the stick or portions was accepted. Two demerit points were allocated.

25. The UK said that it was also important to recognise that deviations in the uniformity of the target fish core weight should be dealt with in the defect table. This would apply irrespective of the fish core content of the product (e.g. near 50 % or for portions with 70 % of core). The USA and other delegations argued that such a problem was already covered by the minimum core content in the standard as well as the net weight provisions. There could be double counting of defects. The UK maintained its view and the chairman agreed that a difference of 20 % in the fish core weight should be inserted in square brackets as a defect attracting 2 points.

26. The working group noted that the previous session of the CCFFP had considered a sample to be defective if the total number of demerit points exceeded 40 for members of the Gadidae family or 50 for members of other species.

27. The Federal Republic of Germany proposed an alternative system calculation as follows:

Fish Core	< 20 demerit points (items 11 - 21)
Whole products incl. frozen and cooked state	< 20 demerit points (items 5 10 and 22 - 24)

The total was not to exceed 30 demerit points.

28. The Working Group could agree in principle to the proposal of the Federal Republic of Germany, but thought that further consideration should be given to the details of the proposal and to specific issues such as the maximum number of demerit points for fish core prepared from species to which 32 demerit points had been previously allocated.

29. Since square brackets had already been introduced in other items the working group proposed to place this section also in square brackets.

30. The working group agreed that in order to apply defects table more detailed instructions were applied. It was therefore decided to recommend to the CCFFP that such instructions should be developped as soon as possible.

31. It was agreed that the sample unit was 1 kg of the total product for assessment in the raw state. For core defects the sample unit was derived from 1 kg of total product from which the coating had been removed. The defects results obtained were to be calculated per 1 kg of fish core. This procedure had been devised to avoid unnecessary wastage. A separate sample of 200 g of the total was required for assessment in the cooked state.

ASSESSMENT OF THE MINCED FISH PORTION OF A MIXED BLOCK

32. Conference Room documents were available describing methods proposed by the delegation of the Federal Republic of Germany, emanating from work in the West European Fish Technologists Association, and by the U.S.A. This second technique was a modification of a Norwegian method for investigating the whole block. It was recognized by the Working Group that discussion of these methods was outside its terms of reference,

but a helpful opportunity was provided because the method preferred by the Federal Republic of Germany and the Norwegian/Federal Republic of Germany methods could be demonstrated at the "NORDSEE" control laboratory.

33. The working group concluded that both methods provided comparable results. Each had advantages in different situations. For example, if the frozen block was not homogeneous the whole block needed to be analysed. The American method was less costly in resource terms but had disadvantages including inevitable uptake of water.

34. It was recognised that the results from both methods did not relate to species with a soft flesh. Initial testing had revealed that the Norwegian method involving spray separation would provide the most accurate results for soft fish, whereas the scraping off by hand could be too subjective.

35. The working group concluded its session by extending warm thanks to the Federal Republic of Germany and the German Fishery associations for their kind and generous hospitality.

ANNEX A

LIST OF PARTICIPANTS

Canada	R. Mills	
Denmark	A. Birch	
Germany, Fed.Rep.	N. Antonacopoulos	
	H. Hesse	
	W. Krane	
	H. Winter	
Iceland	H. Thorsteinsson	
Netherlands	H. Houwing	(Chairman)
Norway	N. Berg	
	H. Blokhus	
	J. Fredriksen	
	J. Race	
Poland	M. Brzeski	
	J. Zalewski	
United Kingdom	J. Cockburn	
	J. Cunningham	
	W.D. Knock	(Rapporteur)
USA	J.R. Brooker	
	K. Iwamoto	
FAO	B. Dix	
	J.M. Hutchinson	
	Z.S. Karnicki	
Observers		
Germany, Fed.Rep.	K. Priebe	
	W. Schreiber	
Liaison Officers	M. Manthey	
	J. Oehlenschläger	
Advisers	H.W. Dunkhase	
	J. Geyer	

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APPENDIX XV

STATEMENT BY THE DELEGATION OF CHINA

Mr. Chairman, Representatives of FAO, Ladies and Gentlemen,

I greatly appreciate the opportunity given by the Chairman to make a short speech at this meeting to introduce the situation about the fisheries and food hygiene of our country.

China is located in the North-west part of the Pacific Ocean which is one of the places rich in fish resources. China has a vast sea area and a long coast-line, the continental coast-line is over 18,000 km and altogether the coast-line of the mainland and islands add up to over 32,000 km. The fishing area within the continental shelf of 200 metres depth amounts to 1.5 million sq.km. And the total area of inland waters is over 20 million hectares. There are over 5 million hectares of fresh water area which can easily be cultivated.

The Government of the People's Republic of China pays great attention to the proper utilization of resources. Especially since 1978, the Government has employed great efforts to develop aquaculture to improve the quality of fish and fish products. At the same time, the policy of the system of production responsibility is executed, and the achievements of science and technology are spread and applied to production, to strengthen the protection of resources and to propagation, so as to enable a rapid development of fishery production. The total fishery output of 1985, including fish, crustaceans, molluscs and seaweeds, amounts to 7.05 million tons. It is 55% more than in 1980 - which was 4.5 million tons, while in 1949, it was 450,000 tons only. In 1985 the marine catches were 3.49 million tons, mariculture was 0.72 million tons, fresh water catches were 0.48 million tons and fresh water culture was up to 2.38 million tons. The production in fresh water is mainly fish.

There are at present more than 100 fishery research institutes and nearly 1,000 technology popularisation stations in China and an applied network on popularization has been established. Among these, the more important research institutes are the six regional fisheries research institutes - the Yellow Sea, the East China Sea, the South China Sea, the Black Dragon River, the Long River and the Pearl River Fisheries Research Institutes. The Fishery Machinery and Ingredient Research Institute and the Fresh Water Fisheries Research Centre have also made contributions to the fishery development of the country.

To promote processing skills and to increase the quality of fish and fishery products, the Government of China has established the Shanghai Fish-Processing Technique Development Centre last year.

It is well known that China first developed the artifical breeding technique of black carp, grass carp, silver carp and big-head carp, which is an epoch making advance in fresh water farming, and China also maintains a leading role in the artificial breeding of prawn and river crab in the world.

On the side of fish processing, China processes about 200 million tons of wet fish per year. According to categories, the proportion of fish products are: Frozen 72%, Canned 8%, Dry-salted 13%, Cooked 4% and the other 3% are the comprehensive utilization of aquaproducts including sea-weeds.

The People's Republic of China has established, so as to better manage the fishery resources and production, the security of fishing boats and fishery ports such as fishing telecommunication activities and the protection of the fishery environment. China has also made many civil fishery Codex regulations and international fishery agreements. But the most important and fundamental one is the "law of fishery", promulgated at the beginning of this year.

In order to assure good food hygiene, to prevent the contamination of foods and the presence of factors that are harmful to human health, to guarantee the physical health of the people, and to strengthen the physique of the whole population, the Government of China has enacted many laws and managing regulations, the most important and fundamental of which is the "Provisional Law of the People's Republic of China on Food Hygiene", adopted on 19th November 1982, at the 25th Session of the Standing Committee of the 5th National People's Congress.

Fish and fishery products as foods should, of course, be regulated firstly by the above fishery law. Until the end of 1984, 65 Food Hygiene Standards had been made by the Ministry of Health and promulgated by the National Standardization Bureau of China. Among the 65 Standards are included 14 Food-Hygiene Standards concerning Fish and Fishery Products. These 14 Standards comprise the main categories of economic fishes in China, such as large and small yellow croakers, hailtail, cuttle fish, round scad, herring, black carp, grass carp, silver carp and big-head, prawn, fresh water shrimp, oyster, clams, crab and so on. Another Food Hygiene Standard is "The Limits of Inorganic Arsenic in Sea Foods". All these are National Standards; the coding of National Standards is "GB".

Secondly, in order to ensure the implementation of the hygiene codes of fish and fishery products, the Government of China also enacted "The Regulation of Management for the Hygiene of Fish and Fishery Products".

As the hygiene of fish and fishery products relates to the quality of fish and fishery products directly, the concerned departments have enacted and are enacting many kinds of quality standards for fish and fishery products. These are classified in two categories - the National Standards coded GB and Ministerial Standards coded SC formulated and enacted by the concerned Ministries.

The quality standards of fish and fishery products are for yellow croakers, hail-tail, pomphret, cuttle fish, sea urchin and its products, file fish and fish meal, products tangle, laver, artificial ice, fish freezing trays, etc.

On the other hand, China also formulated "the Standard of Quality of Water in the Area of Fishery" and its inspection procedure.

This is the situation concerning fisheries and food hygiene in fish and fishery products in our country.

Ladies and Gentlemen, this is the first time that China is attending a session of the CCFFP. We already know about the achievements of this Committee, but now we have learnt very much more in Oslo this time.

We are resolved to do our best to cooperate in the work of Codex in Fish and Fishery Products in the future. Thank-you again Mr. Chairman and Ladies and Gentlemen.