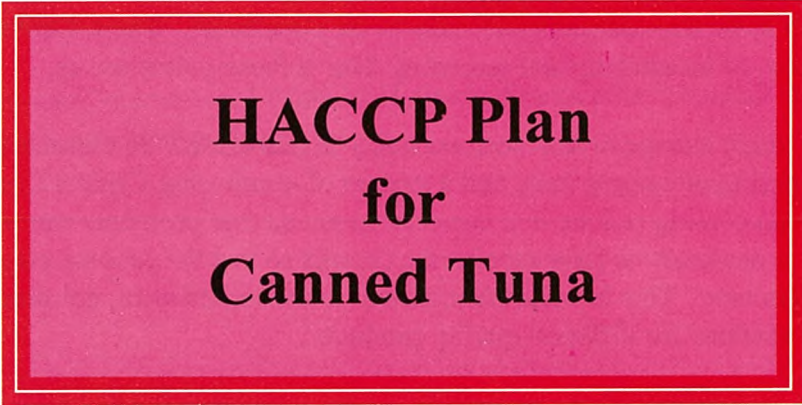


CHAPTER 2



**HACCP Plan
for
Canned Tuna**

Good Manufacturing Practices (GMP) refers to all the measures implemented to ensure product quality, safety and fitness for human consumption; from raw material quality, fish plant construction, personnel hygiene and hygienic operating practices. All processors need to process under GMP's using a system of Quality Control. Hazard Analysis Critical Control Point (HACCP) is a technique for reviewing and analysing a specific manufacturing operation's compliance with the GMP, with the objectives of identifying control procedures and implementing preventive measures required to ensure consumer safety and to prevent economic fraud. It is a system of self-regulatory quality control which, if properly implemented, can be used by both manufacturers and regulatory agencies to provide assurance about the safety of the product.

A number of quality control points exist in the processing of the product. However, critical control points (CCP) are those points in a food production process where failure to carry out control measures will introduce unacceptable risks to the consumers. These CCP's need to be identified, and a system of monitoring and recording data at these points set up.

HACCP represents a major change in how seafood safety is guaranteed. In essence, Hazards are Analysed in the processing of canned tuna, and a system of monitoring Critical Control Points is set up to assure the processing is done in a correct manner so that problems can be prevented before they occur. It is necessary to have monitoring records so that the process may be audited for product safety assurance. This is what the regulator is concerned with, not product quality as there are different markets for different quality products.

A HACCP Plan for the product has to be developed and this section provides information for the development of such a plan. Every manufacturer must develop its own plan (or plans). The HACCP concept is based on developing a plan tailored to particular production lines, thus there may be differences in the plans developed by different companies producing the same product; however, the information presented here is generic to the process of canning tuna.

While it is a system of self-inspection rather than government inspection, the government inspection services will periodically conduct audits of manufactures programmes, to assure that the system is working to prevent hazards to food safety. Importers in countries may have to verify that the programme has been followed; this may include on-site inspection, review of records and the quality program.

Regulatory authorities are concerned with safety; however, many authorities are also concerned with aspects of quality and the prevention of economic fraud. While there are different markets for different qualities of product, the differing limits of acceptability for the markets should not be exceeded. Therefore, the HACCP plan may need concern itself not only with safety, but also with quality and marketing requirements.

To ensure that the quality of the product is maintained, consider merging the HACCP plan developed with the overall quality control programme, but maintaining the HACCP documents separately for HACCP program audit purposes.

Two aspects of a good HACCP plan are not covered in this manual, economic fraud and recall.

The first has to do with labelling. Procedures have to be in place to ensure that the product is not mislabelled to content such as species substitution, or weight and that labelling is done in manner required by the intended market. The second aspect delay with sales and shipping records, coding of the product and recall procedures established; to ensure an ability to trace the products to the customers to whom they were sold.

This information is based on the experience of the Thailand Department of Fisheries in the conduct of their activities. It is given as guidance for the manufacturers to develop their own HACCP plans. The information is generic and must be modified to suit each manufacturers conditions. Further, as noted above, it is not complete. A HACCP plan needs to meet the requirements of the competent authority having jurisdiction.

Lot acceptance should be based on a sampling plan and an example is attached as table 3. Samples of forms which can be used to record keeping purpose are given as table 4.

The Recommend International Code of Hygienic Practice for low-acid and acidified low-acid canned foods is attached as Appendix .

Processing Step	GMP No	Hazard Type	Hazard	CCP	Preventive Measures	Monitoring
Receiving	1.1	Quality Safety	<ul style="list-style-type: none"> - Decomposed fish - Damaged fish 	Receiving area	<ul style="list-style-type: none"> - Control supply source - Have supplier provide a product temperature history 	<ul style="list-style-type: none"> - Measure temperature upon receipt - Visual inspection - Sample for histamine testing
Butchering	1.2 1.3	Quality Safety	<ul style="list-style-type: none"> - Decomposed fish - Histamine 	Butchering tables	<ul style="list-style-type: none"> - Control temperature of fish - Control lag time from end of thaw to end of butchering 	<ul style="list-style-type: none"> - Measure backbone temperature - Sensory inspection - Take sample for histamine analysis
Loin Cleaning	6.4	Quality	<ul style="list-style-type: none"> - Decomposed fish - Green meat, orange meat or honeycomb 	Loin cleaning tables	<ul style="list-style-type: none"> - Control lag time from end of cooking to end of cooling - Control time of loin cleaning and hygienic practices - Train workers to detect loin 	<ul style="list-style-type: none"> - Measure temperature and time of cooling - Visual inspection - Sanitation inspection
Packing	7.2 7.3.2	Safety	<ul style="list-style-type: none"> - Defect empty can 	Empty can storage area	<ul style="list-style-type: none"> - Select can suppliers - Set up empty can sampling plan and specification required - Train workers on container integrity 	<ul style="list-style-type: none"> - Visual and seam tear down inspection upon arrival - Visual inspection prior to feeding to line
	7.3.2	Safety	<ul style="list-style-type: none"> - Over fill 	Weighing table	<ul style="list-style-type: none"> - Adjust packing machine - Calibrate balance and weigh used 	<ul style="list-style-type: none"> - On-line weigh check - Calibration of balance
Seaming	7.4.3	Safety	<ul style="list-style-type: none"> - Defect double seam 	Seamer	<ul style="list-style-type: none"> - Adjustment of seamer - Test run before use - Train Q.C./seam mechanic 	<ul style="list-style-type: none"> - Visual seam inspection - Seam tear down
Retorting	8	Safety	<ul style="list-style-type: none"> - Improper processing resulting in outgrowth of microbes and toxins 	Retort area	<ul style="list-style-type: none"> - Train retort operators - Establish schedule process - Retort equipment checked and calibrated - Close surveillance of operations (by Q.C./Q.A.) 	<ul style="list-style-type: none"> - All thermal processes operations
Post Process Handling	9.2	Safety	<ul style="list-style-type: none"> - Post process contamination 	Cooling zone	<ul style="list-style-type: none"> - Restricted area traffic control - Sanitation 	<ul style="list-style-type: none"> - Check admittance to area (visual inspection) - Daily sanitation check

Critical Limits	Corrective Actions	Verification	Records
Frozen fish < -18°C Fresh fish ~0°C Histamine < 50ppm	<ul style="list-style-type: none"> - Inform/change supplier - If histamine >50ppm, increase surveillance at butchering 	<ul style="list-style-type: none"> - Annually, conduct survey of supplier handling system - Conduct histamine/temperature relationships 	<ul style="list-style-type: none"> - Supplier temperature record - Raw materials receiving record - Supplier sources and history
Histamine <50ppm Fish temperature 0 - 5°C Lag time 2 hours	<ul style="list-style-type: none"> - If >10% grade 3 fish, lot should be individually culled - If >10% grade 4 (rejected) fish found, lot should be rejected - If histamine >50ppm, increase surveillance, more culling for sensory test - Inform supplier - Reduce volume on line 	<ul style="list-style-type: none"> - Occasional increased samplings for sensory and histamine analysis - Check graders' competence with histamine and sensory determination 	<ul style="list-style-type: none"> - Raw fish grading form - Chemical analysis form - Lot processing record - Training record
<ul style="list-style-type: none"> - Lag time not >6 hours - Loin cleaning time <1 hour - No defect or decomposed loin - Sanitation: visually accepted 	<ul style="list-style-type: none"> - If lag time exceed limits, adjust production volume, fish should be put in chilled room for any delay anticipated - Increase surveillance at at butchering table - Improve cleaning and sanitation 	<ul style="list-style-type: none"> - Run pre-cooking test - Conduct histamine/temperature relationship - Check samples on workers and graders - Plant sanitation inspection daily 	<ul style="list-style-type: none"> - Cooling time and temperature record - Loin cleaning and quality record - Training record
[Based on sampling plan and can specifications]	<ul style="list-style-type: none"> - Segregate defect cans - If more than acceptance no. reject lot 	<ul style="list-style-type: none"> - Inspection of can manufacturers - Obtain Q.C. program of can manufacturers 	<ul style="list-style-type: none"> - Record of can manufacturers audit - Empty can inspection record - Can storage, depalletization and feeding log - Can specifications - Training record
[Based on value specified in process establishment]	<ul style="list-style-type: none"> - Segregate defect can - If more than acceptance no. adjust packing machine 	<ul style="list-style-type: none"> - Inspection of performance and practice - Record check 	<ul style="list-style-type: none"> - Record of empty can manufacturers audit - Empty can inspection record - Can storage, depalletization and feeding log - Can specification - Training record
[As determined in initial verification according to size of can]	<ul style="list-style-type: none"> - Closing machine maintenance and adjustment - Hold products for further investigation 	<ul style="list-style-type: none"> - Inspection of performance and practice - Record check 	<ul style="list-style-type: none"> - Seamer inspection report - Visual inspection report - Seam tear down report - Investigation report
[As determined in initial verification - calculated for each retort, can size and product type]	<ul style="list-style-type: none"> - Hold lot/reprocess lot 	<ul style="list-style-type: none"> - Periodic checks on heat distribution in retort and temperature recording equipment. Have process verified by competent authorities. Check competence of operation. - Record review daily 	<ul style="list-style-type: none"> - Retort operation record - Temperature recording charts - Investigation report
Entrance to authorized personnel only	<ul style="list-style-type: none"> - Stop unauthorized entries 	<ul style="list-style-type: none"> - Review of traffic control program by inspection - On site verification 	<ul style="list-style-type: none"> - Product control report - Investigation report

Table 3**Sampling plan and rejection numbers for the inspection of fish**

The sample size, (the number of fish to be inspected) is determined by randomly sampling at least 10 fish from the lot to determine the average weight of each fish. Divide the average weight into the estimated or actual weight of the lot to be examined to determine the total number of fish in the lot. Based on the total number of fish the following sampling schedule shall be applied:

No. of Fish in the lot	Sample Size	Rejection Number *
2 - 15	2	1
16 - 25	3	1
26 - 90	5	1
91 - 150	8	2
151 - 500	13	2
501 - 1200	20	3
1201 - 10000	32	4
10001 - 35000	50	6
35001 - 500000	80	8
500000+	125	11

*the minimum number of defective units needed to reject the lot. Once the rejection number has been exceeded, the inspection may be stopped. Please note: this plan does not apply to lots of fish that were hand culled or graded individually.

Example of Incoming Shipment Inspection Form

Date			
Item			
Supplier			
Code Marks			
Quantity			
No. Units			
Sample Size			
Rejection Level			
No. Rejected			
Accept/Reject			
Condition.			
Consigned to:			
Internal Code No.			
Initial			
Corrective Action/ Notes			

Raw Fish Grading Form

Plant _____
 Date _____
 Species _____

Location _____
 Lot Number _____

SAMPLE																			
TOTE																			
GRADE																			
EYES																			
GILLS																			
TEXTURE																			
PHYSICAL DAMAGE Edible portion of fish																			
BELLY CAVITY Internal organs and belly wall																			
ODOUR Belly cavity and cut through nape																			
GRADE ASSIGNED																			

Comments

Signature of Grader : _____

Signature of Grader : _____

Signature of Grader : _____

CANNED TUNA GMP CHECK LIST

THAWING TO STAGING

Plant : _____

Date : _____

Shift : _____

Inspector : _____

Tank No.	Tote No.	Species	Fish Wt. (Kg)	Water Temperature				Thaw Time		Fish Temperature End of Thaw			Comments	Staging Start	Rack No.	Staging End Steam On	Staging Duration	Butcher Duration	Ambient Temp. (Staging)
				Time/Temperature				Start	End										
				1	2	3	4												

(Developed by DFO Canada)

EXAMPLE NUOCA

No: _____

Company Name

Notice of Unusual Occurrence
(NUOCA)

Line: _____ Time: _____ Date: _____

Control Point: _____

Cited for : _____

Signature (Foreman): _____

Signature (QA/QC): _____

(Developed by National Marine Fisheries Service)