

Application of HACCP System in the Japanese Seafood Industry

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■ Preface

The Japan Fisheries Association (JFA) was established in 1882, as a non-profit organization and has been functioning as the umbrella organization for the entire fishing industry and seafood processors of Japan. JFA has more than 400 members including associations, private companies and individuals, contributing approximately ¥200 million annually in dues. Our purpose is to promote Japanese fishing and seafood industries and contribute to the economic well-being and cultural heritage of our country.

The fishing industry in Japan, with recent annual production of more than 7 million tonnes, has been striving to satisfy our nation's demand for food. On the other hand, seafood processing industry has been providing hundreds of kinds of products for our market. At the same time, these industries are facing several difficult problems both domestically and internationally. To address these problems, JFA has been working to coordinate the views and positions within the industries and to establish the necessary measures, as well as appealing the industry positions to the Japanese government and the general public. JFA also seek to maintain close relations with international and domestic organizations pertinent to fisheries and seafood processors around the world with the hope to achieve the sound and sustainable development of our industries on a global base.

From ancient time, fish and fishery products have been a major protein source for Japanese people, because of its excellent nutritional value. There are so many varieties of seafood now in Japan, and more than 15,000 processors are providing these products to the market. These seafood processors vary from large to small or tiny in its production scale.

For the quality aspect, world market has long been admiring Japanese seafood products, many kinds of fresh and processed seafood products, such as fresh tuna and

skip jack, imitation crab, and seaweed, have been exported to the US and other countries for direct consumption or further processing.

Currently, Japan is the world's biggest importer of seafood, and is buying 3.4 million tonnes of seafood, which is equivalent to 16% of the total world import. Seafood import, especially primary processed fish and shellfish, is increasing in the market share due to its convenience for use. On the other hand, domestic fish and shellfish production has been declining mainly due to resource depletion and fluctuation. The tonnage (for food use only) is 5.0 million tonnes. Also it must be noticed that the difference between the imported and the domestic has been decreasing.

In order to maintain the market share of domestically processed seafood in our country, it is absolutely necessary to maintain the confidence in the safety of seafood products of our consumer, to compete with imported final products, and to take the advantage that seafood products are still, much safer than other kinds of protein foods, such as meat, poultry, and egg products.

Again, taking into account the fact that Japanese consumers generally demand good quality and safe foods, it seems to be absolutely essential that Japanese seafood industries, from catching fish to processing final products, duly implement HACCP-based control to ensure high quality and safety of the products.

■ Background and History of HACCP Introduction in Japan

1. Production

In 1997, fishery production of fish caught domestically in Japan was 7.4 million tonnes in total, which is equivalent to US\$ 20 billion. Main fish species caught are jack mackerel, saury, sardine, mackerel, squid, pollock, crab, tuna, skip jack, and salmon. Almost

all of the fish and shellfish that are harvested at sea, are as follows:

<i>Total production:</i>	7.4 million tonnes
<i>at sea:</i>	7.3 million tonnes
<i>wild:</i>	6.0 million tonnes
<i>aquaculture:</i>	1.3 million tonnes
<i>others:</i>	0.1 million tonnes

In Japan, there are 156,000 companies or individuals engaging in fishing, of which individuals manage 148,000 and companies manage the remaining 8,000.

On the other hand, world production of fish and shellfish now reaches almost 130 million tonnes, of which main species are sardine, jack mackerel, and mackerel. Major fishing countries are currently China, Peru, Japan, Chile, and the US. About 70% of the world production is derived from fishing, whilst the remaining 30% is derived from aquaculture.

2. Processing

Concerning the world trade of fish and shellfish, import is 21 million tonnes (US\$ 57 billion) and the export is 22 million tonnes (US\$ 53 billion), while Japanese import is 3 million tonnes, of which major fish species (or products) are fishmeal, shrimp/prawn, tuna, swordfish, salmon, and cod. The tonnage of Japanese import is equivalent to 16% of the world import. While the value is USD 17 billion, that is equivalent to 30% of the world import. About 150 countries are exporting fish and shellfish to Japan, and the major exporting countries are the US, China, Chile, Norway, and Russia.

In Japan, fish and shellfish still remains the most important source of animal protein. Total animal protein supply is currently 47 grams/day/person, and 40% comes from seafood.

Major seafood products are surimi products (e.g., kamaboko, crab analogue, and tempura), frozen products, salted and/or dried fish and shellfish, and canned seafood. For seafood manufacturing, there are about 14,000 or 15,000 seafood processors, about 98% of which are hiring less than 100 employees and about 95% of which annual sales is less than US\$10 million.

Due to poor economic conditions and recent change of life style in eating, Japanese seafood industry have now been suffering from many difficult problems, such as high price of raw materials, decrease in supply of raw fish/shellfish, depression of sales, competition of price & quality with meat and meat products, decrease in benefit

rate, increase in loan, increase in financial troubles, difficulty in employment, and increase in labor cost.

In order to overcome these hurdles and move to future prosperity, our industry people strongly feel that they should have new strategies to:

- (1) develop new products;
- (2) seek cost down measures by improving productivity;
- (3) improve productivity by introducing high performance instruments;
- (4) expand sales network.

3. Food-borne disease

Outbreaks of food-borne disease in Japan are as follows:

Year	Cases	Patients
1997	1,960	39,989
1998	3,010	46,179
1999	2,631	34,055

The main pathogens and their outbreaks are as follows:

<i>Salmonella</i>	830 cases (12,000 patients)
<i>V. parahaemolyticus</i>	670 cases
<i>Campylobacter jejuni</i>	490 cases
Pathogenic <i>E. coli</i>	240 cases
SRSV	120 cases (5,200 patients)

Other reasons for outbreaks mentioned above are parasites, histamine, and biotoxins, such as tetrodotoxin and mushroom toxins. Among all others, seafood occupies 22% of the incidence and is the biggest identified reason of food-borne diseases in Japan.

In our country, people prefer to eat seafood raw or without further cooking, consequently, the outbreaks occur most often especially in summer time, that are due to *Vibrio parahaemolyticus* associated with consuming raw seafood, such as sashimi and sushi. Illness from SRSV especially in wintertime has been quite frequently reported as associated with eating raw or partially cooked oysters.

In recent years, food-borne diseases have been increasing in Japan. The reasons for this phenomenon are supposed to be that:

- (1) people are eating out of their home more often than before due to the increase of food service facilities;
- (2) more diversity of food ingredients are used, many of which are imported;

- (3) many people, especially young generations, are lacking even in the basic knowledge for hygienic food preparation;
- (4) especially children and aged persons are losing immunity; and
- (5) environmental pollution is increasingly emerging.

■ **Mandatory Programme**

1. **Comprehensive Food Safety Control System**

The Ministry of Health and Welfare (MHW) is regulating food safety and hygiene to protect consumers in Japan. To respond to the request that the government should institute a mandatory HACCP-type regulation for food, MHW revised relevant sections of the Food Sanitation Law, and newly established “the Comprehensive Food Safety Control System” in May, 1995.

According to the explanations given by MHW, this new control system is basically designed in compliance with the provisions of Codex general principle for food hygiene and the related texts, and is primarily based on own-control by each premise, rather than by old-styled official inspection of the final products.

However, this new system is not really compulsory for all processors, instead, only processing plants that apply to MHW and are approved as in compliance with the standard can be registered by the Government. Further more, the system is only applied to several food categories listed by the Minister of MHW. Food categories currently available for the application and the number of registered processing plants are as follows:

- Meat products (82)
- Milk and milk products (294)
- Canned foods (6)
- Surimi products (12)
- Soft drinks (0)

The Comprehensive Food Safety Control System requires processing plants to prepare an adequate level of physical conditions and basic hygiene control procedures necessary to manufacture safe food, as the pre-requisite requirements, and of course prepare HACCP plan(s) and written SSOP. At the time of first application and prior to every amendment to the documents, each company has to submit all the completed documents, as follows:

- (1) Product explanation
- (2) Process flow diagram (step, performance/ specification, time/temp.)
- (3) Layout of the premises (separation of sanitation level)

- (4) Hazards Analysis
- (5) Preventive measures
- (6) Corrective actions
- (7) Written SSOP
- (8) Verification
- (9) Record
- (10) Training, management, and acceptance of official audit

2. **Approval and registration of processing plants exporting to EU**

The European Union (EU) has been laying down health conditions for the production and the placing on the market of fishery products from 1991, by placing EC Directive 91/493/EEC in force. Any nation outside the EU has to have an agreement with European Committee that ensures only the processing plants complying with relevant EC Directive and Decision can export seafood to nations in EU territory.

In order to report the list of officially approved processing plants to European Committee, in 1993, the MHW elaborated new regulations and rules requiring each exporting processing plant to processes the seafood to EU under its own-control system, in compliance with all of the pertinent EC requirements. Currently about 10 processing plants are listed.

■ **Voluntary Programme**

There is a diversity of seafood distributed in the Japanese market, many of which are manufactured using old-fashioned traditional technologies specific to each type of product, and also processed in facilities with inadequate working space. For that reason, there seems to be a lot of difficulties for these processors to try to introduce new process control systems, such as HACCP. Therefore, the programmes for facilitating the introduction of HACCP should be of a nature that fit well into the actual condition of traditional processing procedures and of the limited work space available to small premises.

Many traditional seafood processors are facing the troubles and anxieties that:

- (1) processing plant would need to be re-constructed so as to fulfill the hygienic conditions equivalent to those required for “hospitals”;
- (2) the goal of HACCP-based control is said to be very high and strict;

- (3) huge cost (including time and manpower) must be borne just for documentation of HACCP-plan and SSOP;
- (4) documentation and record keeping seems to be very difficult and complicated to small entities;
- (5) training and education burden would increase the cost;
- (6) there are a few interpretations to HACCP system. Each buyer requires a different HACCP; and,
- (7) many of the seafood processors are feeling strong pressure from retailers and supermarkets that are obliged to promptly start HACCP-based control for consumer confidence.

Our programmes must be of the nature that can solve these anxieties or make these hurdles as low as possible. In this connection, JFA has been working to strongly promote the introduction and implementation of HACCP-based controls especially in the food items other than those covered by the Comprehensive Food Safety Control System Programmes.

The programme by JFA is designed to promote especially small size processing plants to prepare an appropriate level of pre-requisite hygiene conditions and GMPs, and then to start HACCP-based control. The programme covers all steps of seafood production, including aquaculture, fishing, harvesting, fish market, processing, transportation, and retail.

1. Fishing vessel

Fishermen are expected to handle fish and shellfish after capture in an appropriate manner to avoid excessive contamination by pathogens and extraneous substances during fish handling on deck and in the plant, and also to maintain the freshness of catch by controlling the time and the temperature during preparation and storage of fish and shellfish.

In order for fishermen to be aware of the good handling practices for preparing fish hygienically and maintaining a high quality of fish, there must be many opportunities that they can learn why proper handling itself is necessary, and how it can be accomplished in the vessel. At these lectures explanations should be made also for economical and commercial necessity, food safety regulations and rules, and consumer satisfaction. Appropriate texts and audio-visual presentations for these are to be elaborated.

There still remains many old fishing vessels of which facilities are out-dated and the layout is not

adequate for proper fish handling. For this reason, new design of vessels and better handling practices are now under the elaboration.

2. Fish market (off-load and auction)

There are hundreds of fish markets in Japan, almost all of which are old and small. These markets are suffering from decrease in offload volume, decline in number of auctioneers thereby, and the decrease in market price forming ability by fish market.

Because each fish market handles a different type of fish in different quantities, it is almost impossible and not practical to imagine having a single uniform guide for HACCP-based control for all of the fish markets in our country. Instead, for improving hygiene conditions of fish market, detailed research for each type of incoming fish at each fish market must first be done to analyze the actual condition of contamination on the surface of premises and equipment, and water used, as well as on the surface of fish during handling.

At the fish market, a variety of people, such as fishermen, auctioneers, buyers, and garbage collectors, are working in a small space, therefore everybody should be properly informed about the importance and key issues of food hygiene and proper handling in order to share the responsibility of safe food. Sometimes these people do not understand that they are handling fish as "food" and have not had any opportunity to learn about quality control and food hygiene. To this end, education and training seems to be definitely important as the first step, preferably with audio-visual aids. We are planning to start these training sessions at major fish markets first, and then extend to smaller ones.

For proper handling of fish and shellfish at the fish market, suitable guidelines, to which everybody can refer to for good hygienic practices and good handling practices, are now under the elaboration. At the same time, case studies at major fish markets have been conducted with respect to getting enough scientific information and technical data for future HACCP introduction in this area.

3. Processors

Many programmes to promote introduction and implementation of HACCP-based own-control in seafood processors are now in progress from 1995 by JFA, in collaboration with the Fishery Agency. Such programmes

are composed of two major activities, which are education and training of industry people, including top management and factory technicians, and publication of technical guides for HACCP and GMP showing proper hygienic and quality control of seafood.

a. Symposium

Because HACCP is a brand-new concept to seafood industry, it is very important for seafood processors to first know what HACCP is, and how it can be started, despite the fact that Japanese seafood has long been recognized as safe and of a high quality.

In this context, JFA is holding international HACCP symposium, for which JFA invites guest speakers from the countries where HACCP is already in place, in order to share their experiences and the key issues for introducing and implementing HACCP. The following are the countries from which speakers are already invited:

Country	Department
U.S.A.	FDA, Office of Seafood
	DOC/NOAA/NMFS
	Oregon State Agricultural Department
	American Seafood Institute
Alaska	Alaskan Seafood Marketing Institute
France	IFREMER
Norway	Fish Directorate

To encourage the small companies, which hesitate to take up the challenge of the new system, domestic symposiums are also held. At the symposiums, company representatives are invited to report their experiences of HACCP. Many of the speakers gave the impression that they could first understand the real meaning and burden of HACCP-based control before they actually introduce this new system.

In addition to symposiums, which can be held only once or twice a year in Tokyo, the capital of Japan, dissemination of printed matters, such as small pamphlets and booklets explaining about HACCP and GMP, is indispensable in order to make the majority of the 15,000 seafood processors aware and understand HACCP and GMP.

b. HACCP training

The success of a HACCP system depends on education and training to company managers and employees. In this regard, since 1994, JFA has been holding HACCP training courses mainly for industry people responsible for production or quality control. After completing the course, these people are expected to become HACCP team leaders in each processing plant, or special consultants for the seafood industry.

The standard HACCP training course is a 3-day course, where the theory (the 7 principles and 12 steps of HACCP) and skills necessary to make HACCP-based own-control system function properly are repeatedly lectured by instructors, and workshop of several students in a group is done to prepare a model HACCP plan as the case-study. Furthermore, to those who want to master more advanced aspects of verification and record/document scrutiny, another 3-day course is available for the people who have already completed the standard HACCP training course successfully.

For management people, 1-day courses are available, where they can learn the importance and merit of producing safe foods, by improving hygienic conditions of their processing plant and introducing HACCP-based control as a company-policy. Short training courses for plant sanitation and SSOP are also scheduled.

c. Research and study

Because we have not yet enough database that can be used to identify significant hazards for each of the seafood products distributed in our country, scientific research is under the way by JFA. In the research, significance of various hazards in each seafood, technical data for the control of various hazards, monitoring procedures at CCPs for preventing different types of hazards, and quality evaluation criteria and methodologies for incoming and in-process materials are collected. The most important hazards we usually need to pay attention to in hazard analysis of Japanese seafood products are histamine, *V. parahaemolyticus*, parasite, and bio-toxins. For quality purpose in conjunction with HACCP-based control, technologies for evaluating important quality attributes, such as freshness, texture, and labeling, is also being summarized.

JFA has also been collecting and analyzing seafood product samples in the market to evaluate the actual contamination by several bacteria and histamine.

d. HACCP guidelines (manuals)

To facilitate the seafood industry's efforts at improving sanitation and quality control procedures by voluntarily introducing HACCP-system, JFA's guidelines have been published for main seafood products distributed in Japan from 1995. The guideline consists of three sections, i.e., good manufacturing practices, HACCP plan (control measures, model record forms), and SSOP for specific seafood.

Seafood products for which HACCP guidelines have already been published are as follows:

Scallop (adductor mussels, and steamed/boiled scallop meat), Mackerel fillet, Frozen Surimi, Dried Capelin, Cooked fish, Boiled/steamed octopus, Surimi products (kamaboko and tempura), Canned sardine, Dried skip jack, etc.

e. Traditional seafood industry

The Japanese seafood industry has been suffering from decreasing of profits because of many reasons, such as decrease in raw fish supply due to the depressed domestic wild catch, increase in price of imported fish and shellfish for raw materials, and difficulty to raise the price of final products due to long lasting bad economy in Japan. The other reason is that it is fairly hard to secure enough number of employees, due to relatively bad working environment and less favorable payment compared with those of other industries.

However, despite these handicaps, many traditional seafood processors wish to change the situation by introducing advanced technologies thereby securing a predominant position in the market place.

Because there are a variety of seafood products in our country, many of which are manufactured by traditional processing methods, these processors are longing for strong support, in which specific conditions of the industry, e.g. old fashioned manufacturing process, small-scale business, are considered and the counter measures are incorporated.

Inversely, there is little scientific data, which can be used by the industry for preparing HACCP plans. Microbiological change during processing of the variety of traditional seafood is of vital importance. To this end, a database that everybody can access freely is an area is one of our programme goals.

Recognizing the above mentioned, JFA has been conducting "Model Hazard Analysis" for each type of

traditional seafood, which includes preparing the process flow diagram, identifying the process conditions (time/temperature conditions and handling procedures), and sampling and analyzing the raw fish, in-line products, and finished products for pathogenic bacteria and histamine, if applicable.

The next programme is summarizing the actual problems influencing traditional seafood industry, such as small working environment, lack of adequate employment and successor, difficulty of cost reduction. Attention is also being paid to other factors, such as safer working environment, reduction of waste, recycling of waste and packaging materials, and co-operative procurement of raw materials.

f. Small scale operations

As previously described, many of our seafood processors are small, therefore, the lack of appropriate knowledge about HACCP and GMP, and the in-sufficient level of premises for introducing HACCP-based control is generally anticipated. For premises, however, it is very hard for these small processors to invest in another facility, or rebuild the existing facility, in order to expand the production or to improve the sanitary conditions, mainly because of a long lasting bad economy these days. Financial support described below might help to decrease the burden.

On the other hand, knowledge can be learned fairly easily. Our strong feeling is that many small companies have yet to learn or hear about the real meaning of HACCP. There is a lot of misunderstanding about HACCP. Many of these processors fear even to face this brand-new "Black Ship".

One of the tools to solve the above problem is to offer them as many education and training opportunities as possible. To this end, JFA has been sending on-site professional instructors of HACCP, upon requests. And also for mainly management of people, small size training courses are held regionally to teach why it is necessary to introduce HACCP from view points such as management policy, social responsibility of food safety, and international competition. By doing these, JFA is trying to have all the small seafood processors understand and wish to implement HACCP, which would bring them a new horizon of the business.

For another driving force to HACCP introduction in this group, we help small scale processors acquire

third party certification by our organization. Many small scale operators think that it is almost impossible for them to implement HACCP, without even hearing about HACCP from JFA. In order get out of such situation, JFA approves the qualified processors, and issues HACCP implementing certificate, and then open the list in our web-site, so as to make these silent majority know success stories of HACCP introduction and become interested.

4. Aquaculture

In recent years, concerns are raised internationally on the safety of farm-raised fish. Therefore, the Codex Committee for Fish and Fishery Products has been elaborating Codex Code of Practice for Aquaculture, with the assistance of FAO. The Code of Practice incorporates the concept of HACCP.

Also in Japan, consumers raise concerns on the safety of cultured seafood. The main domestic cultured fish species are yellowtail, sea bream, scallop, oyster, and seaweed.

At the beginning, fishermen should know the importance of safe fish and shellfish and the need to introduce HACCP-based control in aquaculture. To this end, JFA has been providing the industry with training and educational courses to illustrate the necessity of greater safety control and HACCP-system, using video and pamphlets. Also JFA has been elaborating HACCP guidelines for main farmed fish and shellfish species, i.e., yellowtail, nori, and scallop. The possible hazards to be controlled in aquaculture include chemical contaminants in waters and the residue of animal drugs used.

■ Japan HACCP Alliance

The Japan HACCP Alliance is the central training body for all kinds of foods in Japan, and is administered by the Japan Food Hygiene Association. The Association serves as the main organization for food hygiene of manufacturers, restaurants, and other food suppliers. The Alliance was established in March, 1998, under the support of two Government authorities, i.e., the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Health and Welfare. Its scope is to:

- (1) train-the-trainers (270 persons were trained already);
- (2) establish standard curriculum for HACCP training;
- (3) maintain nationally organized and harmonized approach to HACCP;
- (4) develop database necessary for HACCP training.

The Steering Committee of the Alliance consists of:
 Japan Food Hygiene Association;
 Japan Milk Association;
 Japan Meat Processors Association;
 Japan Inspection Association of Food and Food Industry Environment;
 Japan Fisheries Association; and
 Japan Food Industry Center.

The number of members is currently 65 and consists of industrial organizations and private companies having interest in the training of HACCP.

The Japan HACCP Alliance training course:

Day	Courses
Day 1	Food Sanitation Law and HACCP principles
	Comprehensive Food Hygiene Control System
	HACCP 7 principles and 12 steps
Day 2	Field study for HACCP plan preparation in groups at the actual plant
Day 3	HACCP plan preparation in groups at lecture room
Day 4	Presentation of HACCP plan for each group
	Discussion and evaluation

■ JFA's New Support Programme

In 1998, JFA established a new support organization, the Seafood Quality Promotion Conference, whose members comprised of processors, fishing companies, fish markets, retailers, wholesalers, consumer associations, construction companies, consultants, officially approved laboratories, etc.

The Steering Committee of the Conference consists of 100 organizations (members) from each sector of these industries. The main activities of the Conference are to:

- (1) train HACCP specialists;
- (2) issue third party certification for HACCP-based processing;
- (3) supply information about seafood quality and safety, HACCP, and ISO9000;
- (4) develop HACCP guidelines; and
- (5) others.

■ Third Party Certification for HACCP-based Processing

Many countries have HACCP-based safety control in place as the mandatory requirements. This means no processing plant needs to be approved nor registered by any third party in such a country. However, this is not the case in Japan. In fact, the only one HACCP regulation in our country, i.e., the Comprehensive Food Safety Control System, has official jurisdiction only to processing plants that have applied to the system and registered by the MHW on their own accord. Without mandatory regulations, each company must introduce HACCP-system voluntarily and seek the best way to declare what they are doing to the consumers.

For the reason above, JFA, as the central body in seafood industry, started a general, or in other words universal, HACCP certification service, designed to cover all types of seafood products and processors other than those covered by the Comprehensive Food Safety Control System. The first step of the service is certification for the products exported to the US.

In 1997, the USDA has enforced new rules of 21CFR part 123, basically requiring seafood processors to process in accordance with HACCP-based safety control. For ensuring good manufacturing practices in all kinds of food, GMP rule (21 CFR part 110) has already been in place from 1973. Imported seafood is also regulated by these rules.

For imported seafood, according to 21 CFR part 123, US importer has to ensure the safety of the lot. An example of the alternatives for an importer to choose to comply with these rules is to:

- (1) import the lot from a processor in the country with MOU, or
- (2) verify compliance with these two rules by:
 - (a) having HACCP/SSOP records from the processor
 - (b) getting third party certification of HACCP/GMP implementation, or
 - (c) others

In order to make it possible for Japanese seafood processors to export their products to the US, third parties listed below are currently issuing HACCP-based processing certificates:

- (1) MHW, as a government inspection authority
- (2) JFA, as a competent third party
- (3) Others, such as SGS and Surefish

■ Challenge to HACCP Under JFA Programme

The JFA has established the system, which enables Japanese seafood processors to be registered and certified by introducing and implementing HACCP-based own-control, thereby, to be recognized that these processing plants are duly manufacturing safe, and high quality seafood.

For the above objective, at first, JFA provide HACCP training courses (3-days) to teach the basic theory and application of HACCP, together with group activities for preparing model (hypothetical) HACCP-plan for specific seafood products. This group activity imitates the actual activity by HACCP-team in each company.

Under the JFA's programme, many other training opportunities and on-site consultations are now available to the companies wishing to start the new system, because HACCP is still unfamiliar to almost all the local seafood processors in our country and is quite hard for the industry to understand the real concept of the system and how to start the application, and its appropriate relationship between SSOP and GMP. To this end, our members, including officially approved inspection bodies, consultation companies, and consulting engineers, are working as competent external professionals in cooperation with JFA.

Our member seafood processors are firstly required to send responsible persons to JFA's HACCP training courses, and then the trained persons will elaborate HACCP-plan and SSOP monitoring procedures. At this stage, a processing plant would invite external professionals, when it does not have enough technical background. In our system, the processing plant is required to duly implement, verify, and record the HACCP-based own-control as described in its own plan, and also to accept external verification by JFA approved auditors at least every 6 months.

Standard procedures for which a processing plant should proceed when applying the system are to:

- (1) assemble the HACCP team (by company policy)
- (2) complete the HACCP training course
- (3) ask for consultation, if necessary
- (4) prepare and implement HACCP plan and SSOP
- (5) correct the system by pre-audit, if necessary
- (6) apply to JFA for registration
- (7) accept audit/verification, and get certification
- (8) accept audit/verification for renewal or new food items.

■ Financial Support

In order to help Japanese seafood processors improve their premises and equipment before starting HACCP introduction, there are currently two types of official financial support managed by two Government organizations, i.e., the MHW and the MAFF, and by the Fishery Agency.

The support provided by the MHW and the MAFF is operated under a specific law. The law was established in July, 1997 and is valid for 5 years. In this system, financial support is available for long-term, with low interest rate finance for construction or improvement of food process building and equipment, and tax exemptions for some of the related activities.

Another financial support administered by the Fishery Agency is designed to provide a variety of finance to seafood processors taking into account the broad aspect of situation pertaining to the renewal of processing facility, and the cost for quality control of seafood.

■ Future Work

The JFA spent almost 6 years promoting HACCP in our seafood industry. As a general conclusion so far, the programmes seems to be a success. There has been a great increase in knowledge, understanding, and expertise of HACCP in our industry. But it is also true that only a small fraction of the industry is actually

practicing HACCP-based own-control. We are still far from the goal to acquire entire consumer satisfaction of food safety and high quality. There are a huge number of seafood manufacturers in our country; therefore, a much more stronger and broader foundation and more effective and efficient strategies are necessary in order to have HACCP prevail in all of the Japanese seafood industry.

Recognizing the above, the following should be our future work and theme:

- (1) For ensuring stronger consumer confidence in seafood products, HACCP implementation "from farm to table continuum" is necessary in each step of fishing, offload, processing, auction/wholesale, retail, and home.
- (2) Adequate training for each step of the above continuum is essentially warranted for proper HACCP introduction.
- (3) Adequate guidelines for proper handling of fish and shellfish at each step are expected to be developed.
- (4) Technical support especially to small enterprises is necessary.
- (5) Programmes for consumer education of food hygiene should be designed on a step-by-step basis.
- (6) Cooperation with exporting and importing countries, with respect to harmonized food safety and quality control, should be promoted.