Application of HACCP Programmes in Thailand

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■ Background of Fish Processing Industry

For decades, fisheries have been an economically important industry to Thailand. It is so not only because of its benefit in providing food supply, local employment, and the generation of other related industries, but it is also one of the major earners of foreign exchange for the country. In 1997, the total fish production was 3.5 million tonnes, of which 2.9 million tonnes was from wild catches and the remainder from aquaculture.

With regards to export, fishery product has ranked as one of the top five leading exported agricultural commodities in Thailand among which, frozen shrimp and canned tuna are the leading items. The major export markets for Thailand are Japan (36%), US (35%), EU (13%) and Canada (4%). The remainder of the exports goes to Australia, New Zealand, Asia, Middle East, South Africa, Eastern Europe, and many others. In 1997, the fishery industry achieved a total of 138.6 billion bahts in export earnings that accounted for 7.7 % of the total export value of the country.

The main contribution to the country's income is from the freezing and canning industry. Exports of traditional products, like dried, salted and fermented products are smaller in quantity and value, compared to frozen and canned products.

1. Freezing industry

The species that are of economic importance and the main raw materials utilized for this industry are shrimp and cephalopods. Despite the decline of shrimp landings in the past decades, shrimp exports have not declined but risen from 121,000 tonnes in 1991 to 156,176 tonnes in 1999. The rise in export is due to the sharp increase in shrimp culture productivity. During the period from 1982 to 1996 the production percentage of cultured shrimp in total shrimp production went up from 6 percent to 85 percent. The aquaculture shrimp production achieves approximately 220,000 tonnes per year. The products exported have been diversified to various major items, such as, cooked PD tail-on, breaded shrimp, raw whole, raw H/L, straight shrimp, and other value added products.

Catches of squid, cuttlefish and octopus have fluctuated widely over the years. Export of frozen cephalopods increased slowly from 68,000 tonnes in 1987 to 72,000 tonnes in 1989 and in 1999, increased to 85,309 tonnes. Japan is the predominant market for Thai cephalopods, followed by Italy and Spain.

Fish and shellfish make up some fractions in export commodities contributing to the country's incomes. The major species are mackerel, threadfin bream, baby clam and mussel. Compared with frozen products, the export value and quantity of shellfish is smaller. Frozen fish fillet is now seldom processed due to the high cost and shortage of economical raw materials. Threadfin bream is mainly used in surimi product and shellfish is used as a component in frozen seafood mix product.

2. Canning Industry

Presently, there are 52 canneries operating in Thailand. Canned tuna is the predominant export item in making up the value of 15.6 billion bahts from 1993 to 17.3 billion bahts in 1997. 1,200 tonnes of tuna is used daily for the total production in Thailand. 80% are imported from overseas comprising the predominant species of skipjack, yellow fin, and albacore. Local tuna like tongol and bonito are also used but in a smaller quantities. The US is a major market, followed by Canada, Japan and EU.

Canned sardine and mackerel are produced in smaller amounts compared to tuna. Major markets are mainly limited to EU, Middle East and Asia.

3. Traditional Products

The small-scale processors mainly engage processing of traditional product and not much modernized technology is used. Most of the products are processed for domestic markets rather than export. Examples of this type of products are dried fish and shrimp, salted fish and shrimp, fermented fish and shrimp and fish sauce. However, there is a trend towards export of some of these products, particularly fish sauce, dried shrimp and shrimp paste.

■ Important Issues Facing the Industry

1. Raw material supply and quality

To serve the increasing production capacity of fishery product, large amount of raw material is required to sufficiently supply the industry. Unfortunately, it is not always the case that the demand will perfectly match the supply. As a consequence of over-fishing and prevalence of diseases in aquaculture, shortage of raw material inevitably occurs at one time or another. In such situation, imported raw materials will be used.

Quality is also another issue. Good product quality can only be achieved from good quality raw material. In many cases, raw material quality cannot be controlled by the industry. The problem is more prevalent in fish caught from the sea than the culture farms.

2. Trade competition

Competition among the processors in the country as well as other exporting countries has become intense. Thailand is no longer considered a place where things can be produced at a lower cost. The cost of basic infrastructure, labor, and raw material are some of the factors influencing the final price of finished products. In addition, to achieve a good quality product, additional cost is unavoidable to be used for maintaining the quality system. To overcome this situation, processors need to move away from primary processing to more diversified and value added production.

3. Trade barriers

Presently, tariff and non-tariff barriers such as high tax rate in some importing countries, requirements on labor practices, environment and specific product standard to another are becoming important issues facing the industry. The tariff problem is more difficult to solve, since the decision is dependant upon and made by the importing countries.

■ Inspection and Quality Control System

The Department of Fisheries (DOF) under the authority of the Fisheries Acts B.E.2444 (1901) is the principle Government agency interacting with the fishery industry and is responsible for the development of this sector including introduction to new technologies, extension, research, regulation and inspection.

The Fisheries Act provides authority for the competent official to lay down conditions for registration of establishments that are involved in trading of fish and fishery products and the fishery industry (Section 25 of the Act).

Under this authority, the DOF lays down conditions and guidelines for approved fish processors.

Currently the DOF has been authorized under the Import and Export Control Acts B.E.2522 (1979) to inspect and control fish and fishery product exported to other countries under condition specified in the Ministerial Notification of the Ministry of Commerce.

The relevant policy to the quality control system states as follows:

(a) To achieve and maintain fish harvesting, aquaculture and processing industry and market where consumers and industry alike are assured of the value, wholesomeness and marketability of fish and fish products - both those consumed in Thailand and those produced for export markets.

(b) To develop and promote appropriate product and process standards which will contribute to the achievement of acceptable quality, safety and identity of fish and fish products, and to provide reasonable assurance of compliance with these standards.

(c) To have in place a fair, visible and effective system that provides reasonable assurance of compliance with product and process standards that includes the requisite trained personnel, equipment, laboratories, protocols and procedures.

(d) To achieve and maintain a high standard of quality in all aspects of the work of the laboratory and field inspection.

The role that the DOF play is to:

(a) Improve quality of fish as raw material through research development on fish handling and transportation.

(b) Provide reasonable assurance that fish used as raw material are free of chemical contaminants, environmental contaminants and toxin through a regular monitoring programme that tests for level of these contaminants.
(c) Apply a risk based and preventive control inspection by implementing a quality management programme based on Hazard Analysis and Critical Control Point.
(d) Ensure the implementation of basic food hygiene, good manufacturing practices and preventive control quality system by the fish-processing establishment.
(e) Provide assurance to the import authorities of the effectiveness of inspection and control system and assurance of product safety and compliance, where relevant.
(f) Ensure that allocated resources are effectively utilized.

Fish inspection and quality control activities of the Department are carried out by the Fish Inspection and Quality Control Division (FIQD) which is authorized as a competent authority for fishery products. FIQD is organized according to the two main different activities, administration services and inspection activities. The inspection activities are performed by the four Regional Centers located in Bangkok, covering Central and Eastern seaboard areas; Samutsakorn, covering provinces around Gulf of Thailand; Suratthani, covering upper Southern provinces; and Songkhla covering lower Southern provinces. The Administration Subdivision, Standard and Inspection Agreement Subdivision and Certification Subdivision carry out the administration services. These three Subdivisions are based in Bangkok.

The Regional Fish Inspection Centers' responsibilities include establishment and process inspection, quality and safety inspection of products and evaluation of the quality control programme of the processors. Each Center consist of 5 sections covering all aspects of inspection as follows: field and facility inspection, physical and sensory assessment, microbiological analysis, chemical analysis and administrative section.

The administration services cover the handling of inspection application, developing of policies, procedures and quality system of inspection programme, interacting with international agencies, providing training programme, and issuing certificate upon requests.

■ Current Inspection Programme

The current fish product safety and quality control programme is based on Good Manufacturing Practices and General principles of Food Hygiene as prerequisite programmes. In addition, all processors under DOF approval are required to implement the Hazard Analysis and Critical Control Point principles. The programme emphasizes continuous problem solving and prevention; from the quality of water used to marketing rather than relying on analysis of product samples prior to exporting.

According to the conditions laid down for approval of processors and products for export, all fish processed and destined for export to countries where DOF is authorized as a competent agency or have agreement with, must be carried out in a DOF registered and approved establishment. To qualify for registration and approval, the establishment is required to meet the Construction, Equipment and Basic Food Hygiene Requirements set out by DOF and have a documented HACCP based Quality programme in operation. To maintain the approval status, the establishment needs to maintain a compliance with the previous conditions and demonstrate that their products consistently comply with the DOF criteria.

The inspection frequency is based on the plant's hygiene and quality system compliance rating, product risk categories and past history of product compliance. The frequency is generally set at 2-4 times per year. If the plant is found not in compliance to the requirements, follow up inspection will be required in a time frame set by both parties.

Besides the regular plant inspection, DOF also monitor the products from the approved processors. The product-monitoring programme is aimed to check the product quality, safety and compliance to DOF criteria or criteria agreed with the import authorities. Frequency of sampling is dependant on performance history of the processor and risk category of the products. Samples will be collected according to the sampling plan and transferred to the laboratory for microbiological, chemical and sensory assessment.

■ Implementation of HACCP Programmes

Since many countries has accepted HACCP as a tool to control food safety and made its application mandatory for fishery products over the past few years, the Thai DOF, as a competent authority, has followed the international trend.

HACCP system was first introduced to the fish processing industry in Thailand in 1991. Following the given training course, the pilot programme of HACCP implementation by the volunteer processors was carried out. The programme involved the development of HACCP documents for the industry and HACCP audit by the DOF. The first outcome of the programme at that time was not very successful due to the confusion of participants on HACCP principles, its development, as well as lack of practical experience on HACCP application itself. As a consequence, continuous training programmes have been conducted for the industry and the DOF inspectors. Generic HACCP plans have been developed for major commodities through workshops. Guidelines for development of documented programme have been provided and updated to meet the international guidelines and importing countries requirements on HACCP.

In 1996, the programme became mandatory for approved fish processors under jurisdiction of the Department. Approved processors must have the HACCP programme implemented, documented and verified by the Department.

Currently there are a total of 201 registered processors with the DOF, of which, 70% have been approved for HACCP. The remainder are in the process of verification.

■ HACCP Requirements for Industry

Processors must institute and maintain prerequisite programmes that meet the requirements specified in Basic Food Hygiene and Good Manufacturing Practices specific for the processing conditions and products. They must also develop a documented HACCP programme for an individual product or process and implement it effectively. To develop a HACCP plan, all food safety hazards concerned must be analyzed and control measures must be established. For each critical control point, the processors must establish critical limits, monitoring procedures, corrective action and verification procedures. Record keeping is required to demonstrate the effectiveness of implementation.

■ DOF's HACCP Verification

The assessment of a processor's HACCP programme will be conducted in two phases: document review and on-site audit.

The document review will be conducted based on the Fish and Fishery Products HACCP Programme — Conditions Laying Down for Processors under the Department of Fisheries Approval. The evaluation of the document is to verify that the company has identified all of the significant safety hazards concerned with the specified operation, and that effective control measures have been established.

When the written HACCP Programme of the company is evaluated and deemed to be sufficient, the Department will perform an on-site audit according to the written Programme.

The on-site audit will be conducted to assess that the written quality document is actually implemented and meet food safety objectives. The audit will be carried out through observation of the processors' activities, interviewing of the personnel involved, and examining of related documents and control records. All non-compliance identified must be corrected within an agreed time frame.

■ Problems Encountered in HACCP Implementation

Over the past few years in HACCP audit by the DOF, problems encountered regarding the implementation of the industry are basically listed as follows:

(1) Validation of critical limits: Critical limits are borderlines to define acceptability and unacceptability of the product. If the critical limits set for controlling the hazards are not properly validated, for example, temperature and time used in pasteurization, or cooking of the product, the HACCP plan will not be able to provide a food safety assurance for the product. In some cases, scientific support for all critical limits selected is not available and the support is not relevant to the processing conditions present in the facility. For those critical limits taken from and supported by the existing criteria/standards set by importing countries (e.g. histamine, water activity content), less problems would be encountered. However, the criteria/standards are still limited and in many cases they differ from country to country.

(2) HACCP verification: Confusion always arises when the company establishes its verification procedures especially for the overall plan. Many companies establish only an annual sanitation check as a tool to determine an effectiveness of their HACCP system. Calibration of monitoring equipment,

review of HACCP plan, and internal audit are unintentionally left out.

(3) Experience and qualification of industry personnel: Some companies have limited personnel to carry out the quality programme. Moreover, the designated personnel have little experience and knowledge of HACCP. Success of HACCP development and implementation in such companies is consequently more difficult to achieve. In addition, support from the top management to the HACCP team ultimately is important. It is obvious that for a company with no support from its top management, it is absolutely hard to develop and maintain a HACCP programme for it to work effectively.

(4) Development of HACCP documentation: Although Codex has established a guideline for HACCP development to be used in the industry, in practice there are still some differences in formats and details required by different customers and audit agencies. Some customers or agencies require the company to identify a particular processing step as a CCP, while the other suggests not to. The completeness of HACCP document is also other issue, how detailed and complete it should be before executing the audit. Judgment still remains to the individual audit agency.

■ Conclusion

HACCP is a preventive approach to assure food safety. Having completed the HACCP plans documentation does not imply the success of HACCP implementation unless the ongoing maintenance of the HACCP in a system is underway. Success of HACCP implementation is not achieved overnight. DOF spend many years promoting HACCP to the export fishery industry. There has been an increase in knowledge and understanding of HACCP by the fishery industry as well as DOF itself. Problems encountered in HACCP application would be minimized through practical experiences of the industry. HACCP audit also needs to be standardized among the agencies and at the international level in order to obtain the same understanding and expectation of food safety.

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