Many parts of the world, including Thailand, have experienced rapid social and economic development. As a result, the application of modern technology and the utilization of chemicals are on the increase in agriculture and the food industry, in order to boost productivity in the face of high competitiveness. Newly emerging and re-emerging biological hazards, particularly those that cause severe diarrhoeal diseases are prevalent in many areas of the country. Food control has thus become even more important for the protection of consumers against health hazards and fraud. However, in view of the limited financial and human resources available to cope with the increasing demographic and industrial growth rate, the Thai Food and Drug Administration (FDA), the main food control authority in Thailand, had to be strengthened for effective food control by modernizing its structure, its methods of work and its information services. This article aims to provide information concerning modernization of food control systems, with particular emphasis on food safety information services, based on the experience of Thailand.

Situation and problems
Data obtained from monitoring food safety in 1995 (1) showed that approximately 30% of food samples collected in regional areas and 18% of those collected in metropolitan Bangkok did not comply with established standards because of contamination by biological or chemical agents.

Contamination by biological agents
Microbial contamination. Analysis of results (2) indicated that approximately 20% of food samples collected throughout the country over the past 5 years contained microorganisms (such as bacteria, yeasts, moulds, coliforms and E. coli) which exceeded mandatory standards, particularly in semi-processed foods, sauces, ice cream, bottled water, ice and beverages, causing "food poisoning" and diarrhoeal diseases in schoolchildren. It is estimated that in recent years 80-90% of outbreaks of foodborne illness could be attributed to contamination of food with pathogenic bacteria. This problem may be associated with ignorance of good hygienic practices on the part of food manufacturers.

Mycotoxin contamination. Based on research conducted during 1989-1991 (3) increasing aflatoxin intake among the Thai population was found to be correlated with increasing incidences of detected liver cancer. Staple food frequently contaminated with aflatoxin include grains, legumes, meats, milk and dairy products, fats and oils, and condiments.

Contamination by chemical agents
Chemical additives contamination. Food additives are used mainly by the food industry when technologically justified. However, in the face of commercial competition, there has been massive utilization of food additives such as flavouring agents, non-edible colours and preservatives. Preservatives such as nitrates and nitrates have sometimes been unnecessarily added in high amounts to a variety of foods. The use of food colouring has also been a serious problem in the past decade. According to a 1974 report (4) on food products, approximately 34% of confectionery products widely consumed by children, collected from various local markets, were contaminated with prohibited colouring agents. Most prohibited colouring agents have been implicated as carcinogens, but the present situation shows some improvement.

Pesticide residues and veterinary drug residues. The use of pesticides and veterinary drugs has been increasing rapidly in order to maximize agricultural production. Pesticide residues in foods create health problems due to misuse and mishandling by farmers and other users. National epidemiological data (5) have shown that several cases of foodborne disease occurring among schoolchildren and factory workers were related to accidental contamination of foods by pesticides.
Heavy metals contamination. Unintentional contamination of food by heavy metals has resulted from manufacturing processes as well as from environmental pollution. Seafoods, particularly molluscs, were found to be contaminated by mercury and cadmium at appreciable levels. Certain fermented foods, vinegars and beverages were found to be contaminated by lead from the environment as well as from ceramic containers. Some reports indicated that villagers in the southern part of Thailand, particularly Ronpiboon area of Surat-Thani province, suffered from skin diseases due to the chronic toxic effects of arsenic, after consuming local underground water for several years.

Food control strategies
In order to cope with the ever increasing magnitude and complexities of food safety problems and foodborne diseases, a food control programme was incorporated into the Seventh National Economic and Social Development Plan (1992-1996). The main strategies adopted and implemented by the Thai FDA may be summarized as follows:
- to improve the infrastructure of the food control system, including revision of food registration, in order to effectively protect consumers against unsafe foods;
- to increase efficiency of cooperation as well as coordination among agencies involved in food control;
- to develop an integrated information system with other agencies leading to the establishment of an information network for the collection, monitoring and dissemination of information to the public;
- to initiate food surveillance in order to trace problems and search for appropriate preventive or corrective measures;
- to promote and implement self-protective measures involving public participation;
- to promote and upgrade manufacturing standards of food-processing factories in conformity with good manufacturing practice (GMP), and Hazard Analysis and Critical Control Points (HACCP) system; and
- to improve consumer protection in the provincial areas, aiming for equity in coverage.

Regulatory enforcement
The FDA is the prime agency responsible for the implementation of national food control programme in coordination with other agencies, both within and outside the Public Health Ministry. Its main duty under the Food Act B.E.2522 (1979) is to guarantee the quality and safety of foods by establishing food safety standards or hygienic practices, labelling requirements, production control, and controlling the importation and advertising of food products, as well as the registration of specifically controlled foods. The principle of the regulatory procedures for food safety comprises 3 areas: pre-marketing control, post-marketing control and surveillance.

Pre-marketing control
Establishment of food standards and manufacturing requirements. A set of standards, supervised by the subcommittee on food standards and manufacturing requirements, constitute the minimum acceptable requirements.

Control of food manufacturing. Food manufacturers must apply for a licence prior to opening their business. Plant lay-outs must be submitted for the approval of the Food Control Division. The FDA inspectors will then visit and inspect the plant before a manufacturing licence can be issued. It is the responsibility of the licencee to renew his/her licence every 3 years.

Control of food importation. A licence is required for importing food into the kingdom, and it must be renewed every three years. A licencee may import various kinds of food provided that they are approved by the Office of Food and Drug Administration. FDA inspectors will visit and examine the appropriateness of the designated storage place or warehouse before a licence is issued.

Control of food products. A food product, either manufactured or imported, if categorized as "specifically-controlled food" must be registered. Results of analysis of the product and details of the manufacturing processes and its ingredients must be submitted along with an application for registration. Food additives themselves are subject to approval before they can be used.

Control of food advertisement. All forms of food advertisement through any mass media are subject to approval from the FDA. Advertisement of false or deceptive quality or benefit is prohibited. The approval covers the statements and visual materials to be used in food advertisement.

Post-marketing control
Monitoring of compliance with the regulations. The monitoring process is intended to ensure that food as distributed to consumers is wholesome and that the quality complies with the national food standards. Inspection of food factories and premises throughout the country is regularly conducted together with sampling of food products for laboratory testing. In cases of violations, actions such as seizures, product recalls, and prosecution will be carried out. Technical advice on the development of food production, delivery, handling and storage may be given during the monitoring processes.

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**Food surveillance**

The aim of the programme is to assure the safety and quality of food distributed in the market throughout the country. Food surveillance is conducted by several ministerial agencies, e.g., Ministry of Agriculture and Cooperatives, Ministry of Science, Technology and Environment, Ministry of Industry, Bangkok Metropolitan, and the Office of the Prime Minister. However, the FDA plays the major role and has overall responsibilities. FDA inspectors will take samples of food at market places from time to time, and whenever problems arise. The samples are delivered to the Food Analysis Division, Department of Medical Science for analysis to identify toxins, pesticide residues, heavy metals, nutritional values and standard conformity. Warning and legal actions, such as seizures, product recalls etc., are taken depending on the degree of violation. Consumer awareness of the importance of selecting quality food is always encouraged through the dissemination of related information and educational material to the general public.

**Modernizing the food control system**

In 1995 the Thai FDA reaffirmed its mandate as “an agency which protects consumers on health products especially their safety, qualities and benefit by unique and systematic performances and cooperation among concerned agencies while building up credibility and satisfaction among business operators, as well as acceptability at global level” (6).

In order to fulfill its new vision the Thai FDA has proposed and implemented a series of activities which can be summarized as follows:

**Changing the working system and infrastructure.**

Due to understaffing and increasing workload, the FDA has developed systems and procedures to increase working efficiency by combining pre-marketing control processes (such as licensing of food premises, food product registration, food labelling approval, etc.) and post-marketing control processes (such as inspection of food premises and sampling of food products, taking legal action etc.) into an integrated service. As a result, both business operators and consumers benefit from more efficient and faster services.

**Information system.**

To increase its efficiency in accessing relevant information the Thai FDA has recently established an information centre for consumer protection which collects, compiles, monitors and disseminates information. It is planned to link this data system to all units within the FDA, and to all departments in the Ministry of Public Health (MPH) as well as to 76 provincial health offices throughout the country. Moreover, telecommunications using the Internet via the computer centre of the Ministry of Public Health will enhance information exchange with international organizations and with concerned agencies of other countries. Therefore, the level of efficiency in inspection, monitoring and information service is expected to be significantly improved.

**Establishing regional technical centres.**

In 1992 the Thai FDA delegated its duties, provided by the Food Act, to the provincial health offices in all regions. In order to keep the same standard operation procedures, it has recently initiated a project to establish 12 regional technical centres. These regional centres are intended to serve in supporting and coordinating work between provincial health offices and the head office in order to increase both the consistency and efficiency of consumer protection activities at intra- and inter-provincial levels.

The first regional technical centre has already been established and is functioning in Chonburi province. The remaining centres should be completed within the Eighth National Economic and Social Development Plan (1997-2002).

**Revision of food legislation.**

Since the existing Food Act has been in force for almost 18 years, some provisions are obsolete and cannot keep up with the present situation. The need for revision of the act itself is supported by all parties concerned. The FDA recently drafted a new text to replace the Food Act 1979 (B.E.2522). In principle, the revised legislation will emphasize deregulation and shifting pre-marketing control measures into monitoring measures. Moreover, provisions concerning innovative practices such as direct sale control which is now a major problem, will be added. It will also facilitate harmonization with international standards to promote food export. In addition, HACCP approaches will become compulsory for certain food products. As for violation of the law, the penalties foreseen will be more severe and strictly enforced.

The Thai FDA has encouraged consumer participation in monitoring violations of food laws by issuing a new ordinance which offers a reward for any report of violation. This ordinance was approved by the Finance Ministry and became effective in June 1995. Up to now, several cases of violations such as illegal production or importation, as well as the sale of adulterated, mislabelled, substandard and unsafe foods have been reported by concerned consumers, resulting in strengthened consumer protection.

**Cooperation and coordination among concerned agencies.**

In Thailand, various agencies are taking part in food control, resulting in the duplication of some activities. There is a need to strengthen cooperation and coordination among concerned agencies with respect to food safety in all stages of the food chain, starting with production and harvesting at the farm, through processing and marketing until the product reaches the consumer. The FDA
therefore organized a national seminar in April 1995 in order to brainstorm and reach an agreement among concerned agencies. The main considerations were to avoid duplication and overlapping of responsibilities among concerned agencies to maximize utilization of resources and complementarity in order to improve food safety. Participants consisted of representatives from various organizations such as the Ministry of Agriculture and Cooperatives, the Ministry of Industry, the Ministry of Sciences & Technology and Environment, the Ministry of Finance, the Ministry of Public Health and the food industry. They unanimously agreed in principle to establish a network in food safety control as shown in the proposed model (Fig. 1). The outcome of this seminar should lead to the formulation of a national food policy including a food safety scheme. A Food Import & Export Inspection and Certification system will also be an integral part of this national food safety scheme.

**Upgrading manufacturing practices by implementation of HACCP.** The Hazard Analysis and Critical Control Point (HACCP) concepts were introduced into the food inspection programme during 1990 in order to ensure the safety and quality of food products. This system is used to assess hazards and establish specific control measures for prevention and control, rather than depend on finished product testing and conventional inspection methods. The food industries are encouraged to adopt HACCP approaches and good manufacturing practice (GMP) codes on a voluntary basis through guidelines and manpower development. Priority target groups for the implementation of HACCP are manufacturers of exported low-acid canned foods, frozen seafoods and meats as well as bottled water.

**Public education and consumer participation.** The objectives of food control could not be achieved solely by law enforcement, the setting up of a control organization or the promulgation of regulations. It could be said that benefits derived from a food control service will depend on the degree of consumers' awareness and support. Consumer education and participation, therefore, should be considered as an important function of food-control organizations and inspection services as well. The scientific and technical information of current concern regarding food safety such as risk assessment and food safety evaluation, aspects of food hygiene and proper handling practices, and protection measures have to be disseminated, in order to raise the awareness and knowledge of consumers. In 1996, the Thai FDA started a programme on “campaign of label reading before...
buying" using various media such as radio, television spots and printed material. In addition to this programme, electronic messages such as "audio text" were initiated in September 1996 to promote consumer education. Under the responsibility of FDA, "audio text" is a useful tool for consumers who are interested in gathering information relevant to health products, in terms of safety aspects, status of regulation, etc., through an automatic answering telephone system.

**International cooperation.** As a member of the World Trade Organization (WTO), Thailand is obliged to follow the Sanitary and Phytosanitary Measure (SPS) as well as the Technical Barrier to Trade Measure (TBT), and must, therefore, adjust its strategies to regulatory measures and various control procedures for the benefit of international trade. Activities such as (i) harmonizing of national regulations along the line of Codex recommendations, (ii) participating in drafting Codex standards and related codex activities, (iii) disseminating regulatory information to other member countries as required and requested, and (iv) inspection and certification of export foods to build up credibility and acceptability of importing countries are considered high priorities.

**Summary**

Food control is essential for the benefit of local consumers as well as international trade, which impacts on the overall social and economic concerns of the nation. Nevertheless, success in food control implementation will not be achieved by a single agency. Concerned agencies as well as food industries have to be fully aware of and be responsible for the production of good quality and safe foods. Efficient cooperation and coordination among the agencies concerned, therefore, is indispensable in the development of food safety. The Thai FDA has recently attempted to modernize its food control system by various approaches, including the establishment of a national food safety scheme and the introduction of modern technology as well as restructuring and changing the working system. It is anticipated that control along new directions may enhance better consumer protection in this country.

**Résumé**

**Modernisation des systèmes de contrôle des denrées alimentaires: l’expérience de la Thaïlande**

Le contrôle des denrées alimentaires, indispensable à la protection des consommateurs locaux, a également des répercussions favorables sur le commerce international, et donc sur le bien-être économique et social de l’ensemble du pays. Toutefois, le contrôle des denrées alimentaires ne peut être mené à bien par un organisme unique. Les organismes intéressés et l’industrie alimentaire doivent être pleinement conscients de tous les aspects de la salubrité des aliments et assumer la responsabilité de la production d’aliments sains de bonne qualité. Une coopération et une coordination efficaces entre les différents organismes intéressés sont essentielles pour assurer la salubrité des aliments. La Thai Food and Drug Administration (FDA) s’est récemment efforcée de moderniser son système de contrôle des denrées alimentaires par divers moyens, notamment la création d’un système national de contrôle de la salubrité des aliments, l’introduction des technologies modernes, la restructuration et la modification des méthodes de travail. Ces changements devraient améliorer la protection du consommateur dans ce pays.

**References/Références**


