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THESIS

CAPACITY ENHANCING PROGRAM OF THAI FOOD SMEs

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This research aimed to create a training program for continuous enhancing the Thai food SMEs. Survey on the current market food SMEs in Thailand was conducted in order to conclude for business characteristic based on its raw materials. To classify Thai food SMEs, the questionnaire was develop in order to collect the information of food safety awareness and understanding, business profile and incentive factors and needs for food safety management system development of the companies. K-means clustering was applied to classify food SMEs, based on the level of awareness. Then, the information of business owner profile in each awareness level group was identified as well as all relevant needs for food safety and quality management improvement. All information from the survey and analysis was then extracted for capacity enhancing program of food SMEs in Thailand.

In order to enhance Thai food SMEs capacity, "strengthening food SMEs through semi-tailor made capacity enhancing program" was planned. It proposed the flexible skill sets which suitable with appropriate entrepreneurs based on their profile. Since we found, capacity enhancing programs should be imposed differently depending on the quality and safety awareness level of each SME. From cluster analysis, Thai food SMEs were divided into two groups based on the corresponding awareness level. Different awareness levels had different in profile of education, business operation model, enterprises' size and business income, apart from different in incentive factors to food quality and safety system adoption. However awareness level of food SMEs had no correlation with type of raw materials

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Student's signature Thesis Advisor's signature

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CAPACITY ENHANCING PROGRAM OF THAI FOOD SMEs

INTRODUCTION

Food small and medium enterprises were one of important stakeholders in Thai food supply chain that had the great impact over the country. The growth of SMEs both in terms of building value in business and increasing national employment had come to be identified as the driving force for Thai economics development.

Nowadays competitive situation effect the adoption of each business for enhancing their ability to compete with others. It was essential for SMEs to explicitly understand the influence factors for their business sustainability. One of those would be their understanding of the food market trend, including the consistency of their production based on food safety and product quality. Since consumers become increasingly in food safety mind, food quality and safety were the important issues. According to this fact, the development and improvement of SMEs products quality and safety could be the basic requirement in order to fulfill the customer satisfaction. When entrepreneurs were product quality and food safety conscious, they are able to put efforts of providing good food standard accordingly. It is clearly to state that the attitude, understanding and awareness among small and medium processors should be assessed before the food quality and safety managerial aspect would be introduced if they would like to maintain their competitiveness in the processed food market (Iffour, 2003; Yapp and Fairman, 2006; Raspor, 2008).

OBJECTIVES

1. To study the current market food from SMEs in Thailand.

2. To group awareness on food quality and safety among food SMEs in Thailand.

3. To study incentive factors for the adoption of food quality and safety system in SMEs.

4. To study capacity building request from SMEs

5. To create a training program for continuous capacity enhancing Thai food SMEs.

LITERATURE REVIEW

1. Fundamental Knowledge of Small and Medium Enterprises (SMEs)

Definitions of small and medium enterprises (SMEs) differ widely in various countries. In general, SMEs were classified based on the number of employees, invested capitals, total amount of assets, sales volume and production capability. In Thailand, the Ministry of Industry classified enterprises into three sections including production, trading and service business. Defined a business that had employees less than 200 and fixed capital less than 200 million baht as SMEs as follow:

Table 1 Definition of SMEs provided by the Ministry of Industry, Thailand

Business Type	Small		Medium	
	Employees	Capital (million baht)	Employees	Capital (million baht)
Production	≤ 50	≤ 50	51-200	51-200
Wholesale	≤ 25	≤ 50	26-50	51-200
Retail	≤ 15	≤ 30	16-30	31-60
Service	≤ 50	≤ 50	51-200	51-200

Source: Office of Small and Medium Enterprises (2010)

1.1 Role and Importance of SMEs

The importance of SMEs to the development of the Thai economy was shown by both its large GDP value and its major role as an employer.

In Thailand 99.7 percent of all food and agricultural business were SMEs (Office of small and medium enterprises [OSMEP], 2008). It had been recognized as one of priority area for Thai economic as it generated about thirty percent of the Gross Domestic Product (GDP) (OSMEP, 2010). The influence on the rural development which sought to economic activities in the rural sector was also addressed since SMEs generally based in rural areas and made extensive using of indigenous raw materials and labor (Harvie and Lee, 2002; Kenan Institute Asia, 2008). As presented in table 2, SMEs employed around ten million employees in 2009, or 78.20 percent of the manufacturing workforce. The gross domestic product (GDP) of the SME in 2009 was 37.8 percent of the country's GDP and food products accounted for 8.5% of GDP (Kenan Institute Asia, 2010).

Table 2 Number of employment by SMEs

Size	Employed (person)	Percentage
Small and Medium Enterprises	9,701,354	78.20
Large Enterprises	2,704,243	21.80
Total	12,405,597	100.00

Source: OSMEP (2010)

Additionally, it had been supporting large enterprises in terms of supplying raw material and intermediate products for linking its production (Jumnion, 2000). Such a significance of SMEs, the government of Thailand allocated over three billion baht on promoting SMEs under the second SMEs Promotion Master Plan (2007-2011). This

plan focused on increasing the efficiency of business operation including enhancing the potential of SMEs in line with the changing of consumers' behavior. Moreover, building knowledge for SMEs personnel and product development support to SMEs operators, creating market opportunities and database development were in the focused of the Ministry of Industry in the fiscal year 2010.

1.2 SMEs Related Agencies and Institutions

There were numbers of SMEs supporting agencies and institutions both in the government and in the private sector that played a role in the promotion of SMEs in various aspects.

1.2.1 Office of Small and Medium Enterprises Promotion (OSMEP)

OSMEP was established to serve as the central agency in formulating policies and plans, as well as act as coordinator in SMEs promotion in Thailand. Their mission, as stipulated by the Small and Medium Enterprises Promotion Act, B.E. 2542 (A.D. 2000), was to organize processes of assistance, promotion and support for SMEs, and also to arrange appropriate privileges in order to develop SMEs strength and efficiency. Additionally, it was the focal organization in coordinating the working systems of government sector including agencies in the bureaucratic system, government agencies and state enterprises that worked on SMEs promotion to ensure continuity and harmonization of all efforts.

1.2.2 Institute for Small and Medium Enterprises Development (ISMED)

In 1990 a non-governmental organization, ISMED was set up with its responsibility to enhance SMEs' business capabilities and build their competitiveness through training, seminars, business counseling, research, and networking. ISMED provided services to meet the different needs of each group of SMEs. They categorized SMEs into 4 stages; emerging entrepreneurs with potential, existing SMEs who were affected by the economic crisis, SMEs with proven sustainability and SMEs with high efficiency and competitiveness.

In addition, ISMED also had affiliated network including education institutions throughout the country, selected by their academic excellence and geographical locations which provide cooperation in technical/managerial resources to assist SMEs development.

1.2.3 National Bureau of Agricultural Commodity and Food Standards (ACFS)

ACFS was a governmental agency under the responsibility of the Ministry of Agriculture and Cooperatives. It was the national information center for agricultural and food standards and was making effort to ensure the safety of food and agricultural commodities produced in Thailand as it had become trade requirements. Their core functions were setting standards for agricultural systems, commodity and food items and food safety. Accreditation of certification bodies, control food standard and promotion of standard compliance for farms and food establishments were also in their line of duty.

1.2.4 Management System Certification Institute (MASCI)

MASCI was established by the Ministry of Industry in 1998. It is an independent organization operating under the responsibility of the Foundation of Industrial Development (FID). Its mission was to enhance the efficiency and quality of Thai industrial sectors by assisting them in implementing and following international standards. In addition, MASCI also helped developing skilled and knowledgeable personnel in both the public and private sectors to sufficiently meet the international management standards needs of Thailand.

1.2.5 Small and Medium Industry Institute (SMI)

Recently in 2008, SMI had been found by The Federation of Thai Industries (FTI) with the aim of integrating knowledge for SMEs in the production sector, as well as public the challenges/needs of SME. Moreover, its serve as a focal point for dealing with relevant government agencies, private sector and members of FTI to enhance the business opportunities, capacity strengthening and support entrepreneurship for sustainable development.

1.2.6 Board of Investment (BOI)

BOI were enacted in 2002, under the responsibility of the Ministry of Industry. It had the duties of assisting prospective investors, appraising projects requesting promotion, conducting studies and research in identifying investment opportunities and formulate an investment promotion programme.

Since 2009, BOI had provided SMEs scheme which would support the Thai small and medium entrepreneurs in aspect of tax incentives such as exemption of import duty on machinery, eight-year corporate income tax exemption, etc. Apart from tax benefits from BOI's service, there were also acts an intermediary between manufacturers of finished products and small and medium parts manufacturers (Duangjai, 2010)

1.2.7 SME Bank

SME bank responsibility was focused on the financial access especially to SMEs. They provided both pre-lending and post-lending business incubation services with an aim to assist SMEs to start-up expand or improve their businesses. Additionally there were also had a mission to develop a network of strategic alliances with public and private-sector, in order to draw upon the knowledge and expertise in SME. (SME Bank, 2004)

1.3 Difficulties and Limitation of SMEs

Although there were several agencies in Thailand had been tasking on SMEs promotion and raising their competitiveness, Thai SMEs still confronted many difficulties in striving for a sustainable growth and raising their competitiveness as follow:

1.3.1 Financial Access

Difficulty obtaining credits from financial institutions remained major impediment for most of SMEs including a shortage of working capital. Since they had lacked the standard accounting procedures implement (International Institute for Trade and Development [ITD], 2009)

1.3.2 Access to the Market

They might face with the market knowledge insufficiency such as information about market opportunities and hence could not produce products based on market demand. Moreover, most of their market depended on the regional demand in local/community market. Expanding the distribution into modern trade would be another difficulties for SMEs to expand the existing market as the complicated of regulation for entering the market, high cost occurred (Suchaoon *et al*., 2009).

1.3.3 Workforce

In order to strengthen SMEs ability, personnel in the businesses need to be developed and support their skill and knowledge. However, unavailable of an appropriate workforce was seen to act as limitation in most of SMEs. According to the statement of Economic Research and Training Center [ERTC] (2008), lack of qualified personnel might cause by their ability to pay wage which were not sufficient and less than the payment from large businesses, together with high turn-over rate. On the other hand, although SMEs had enough sufficient personnel, high cost of attending training for both entrepreneurs themselves and their workforces would be one of the

obstacles. Instead they substituted with in-house training such as on the job training, job rotation, but as technology has developed continuously, their employees would be fallen behind.

1.3.4 Lack of Formal Management

Thai SMEs still had weaknesses on business management (Manager Online, 2009). The majority of SMEs did not have effective systems in place since they were mostly family businesses and had their own managing styles which sometimes were not of international standard.

1.3.5 Access to the Government Support

Complexity of government system and time consuming of accessing to the government support were in the concerned among SMEs (ERTC, 2008). Resulting in SMEs, who had not severe problems, were rarely to attend in any support policies. Subsequently, it was hardly for SMEs to obtain knowledge or access information and implement new technology in their business. Main root of this problems were from lacking of integrated and harmonious operation between policies even though the policy was launch from the same department.

2. Fundamental Knowledge of Food Safety and Quality

Food safety and quality can be referred to a suitable product that had been produced through applying universal standard knowledge to all food operations which when consumed orally does not cause health risk to consumer (Food Safety and Inspection Service [FSIS], n.d. ; Pattaralak, 2005).

2.1 The Importance of Food Quality and Safety

Food quality and safety, there were both in theory and in practice an important relation between quality and safety. Food quality could be considered as a complex characteristic of food; texture, color, aroma, nutritional value, that determined its value or acceptability to consumers (Food and Agriculture Organization of the United Nations [FAO], n.d.). Food safety characteristics were typically not directly visible (Mørkbak, M.R. *et al*., 2009). In general, it referred to food that no danger from pathogenic microorganisms, potentially harmful chemicals and other toxin.

At present, foodborne illness still was a primary health issue facing Thais. The information of the illness cases cause by food and water borne diseases from Ministry of Public Health for the period Jan 2010 to 11 December 2010 was presented in table 3.

Table 3 Number of cases and death from food and water borne diseases

Food and Water Borne Disease	Number of Cases	Death
Cholera	1959	15
Diarrhea	1,279,581	78
Food Poisoning	99,671	5
Dysentery	14,138	0
Enteric Fever	2,351	0
Typhoid and Paratyphoid	3,528	1
Mushroom Poisoning	1,899	16
Hand Foot and Mouth Disease	12,155	3

Source: The Department of Disease Control, Ministry of Public Health (2010)

Reported of foodborne diseases incidence was probably much higher. As most people, who suffering from foodborne poisoning do not seek medical assistance. In addition to illness caused by foodborne disease, economic impacts on individuals and

national including loss of income, the cost of medical care, the cost of investigating foodborne disease outbreaks, legal costs and loss of business reputation which hardly to estimate were incurred.

As such the consequences of non-safety food damage include with urbanization and industrialization, lifestyles, attitudes and behavior of consumers toward food safety had been changing. They were become increasingly in food safety mind. Tabai and Salay (2003) stated in their report that consumers tended to substitute product with another whose quality was not doubt. Similar finding from Briz and Ward (2009), in which food safety issues had driven consumers to search for safer foods whose qualities and attributes were guaranteed. Consequently, several of food standards were established to prevent of foodborne illnesses, minimized food hazard during the process and ensured the safety and quality of food products.

2.2 Food Safety Standard

Nowadays, the food safety and quality had been in the focus for both developed and developing countries in respond to the consumers' consumption behavior. Consequently, greater attention to the safety control of the food stakeholders throughout the supply chain had been placed. There were many standards establishment from locally agency like Ministry of Industry which stipulated Local Community Standards, and global standards such as ISO, HALAL etc. In this paper would categorize food related standards into three groups as followed:

2.2.1 Food Safety Management System

2.2.1.1 Good Manufacturing Practice (G.M.P.)

GMP stands for Good Manufacturing Practices, which was a minimum sanitary and processing requirement applicable to all food operation in order to ensure the hygienic foundations. Key provisions of GMP consisted of seven subparts. First subpart was divided into four sections: terminology, personal hygiene, food safety training, supervisory personnel assignment. The subpart further discussed

about maintenance of building and operation of facilities. The sixth subpart outlined the requirements and expectations for the design and maintenance of equipment and utensils. Production and process controls were listed in the follow subpart. The last subpart was the defect action levels which referred to a defect that is unavoidable even when foods are produced under GMP (FDA, 2009). GMP regulation allowed multiformity of implementation along with food processing manner that best suit their needs. It referred as a prerequisite programmes before establish other food safety management and food quality assurance systems.

2.2.1.2 Hazard Analysis Critical Control Point Systems (HACCP)

HACCP had been adopted by the Codex Alimentarius Commissions. It was an approach that had been developed to systematically identify and control food hazards. Ensuring food hazards related were prevented, eliminated or reduced to an acceptable level with specific control measures (FDA, 2010). The approach had seven principles; identify the hazards and assess the risks, identify critical control points, establish critical limits, monitor the controls, taking corrective action, verify the procedure and documenting the process.

HACCP could be applied along the whole food chain from the primary processor to consumer. Apart from food safety enhancement, HACCP system application, which was compatible with other management systems such as ISO 9000 series, would improve consumer confidence in the safety of food products and promote international trade as its equalization food safety control system in the world (FAO, n.d.)

2.2.2 Quality Management System

2.2.2.1 ISO Standard

International Organization for Standardization (ISO) was a network of the national standards institutes of 163 countries; one member in one country. It officially began operations in 1947 in Geneva, Switzerland in order to

develop and publish the standard. Since then ISO had been developed over 18000 international standards for all industry sectors, for example, agriculture, health technologies, plastics, food technology etc. The work in the field for food technology of ISO assisted stakeholders operation throughout the food chain which consisted of agricultural producers, food manufacturers, animal feed producers, private independent laboratories, merchants/retailers and consumers.

Most widely known ISO's quality management system standards was ISO 9000 family. It was a basis for organizations to be able to demonstrate that their businesses had been managing in the way to achieve quality products/service consistency (ISO, 2010). As there were the numbers of national standards which caused confusion, recently ISO 22000 had been established. Blanc (2006) stated that it was the first standard which endorsed the Codex Alimentarius recommendations. Furthermore, it also attempted to fill the gaps and integrated all the key elements of FMP and HACCP together with a comprehensive management system in order to ensure food safety for the whole food chain.

2.2.2.2 Local Community Standards

This standard had been established to be the guideline for local community processors to produce quality and safety products. Its aim was to raise the competitiveness of local community products through the improvement of quality and consistency in local production as well as create the linkage between indigenous products and market. This standard had widely certified the local community products under One Tumbon One Product Project (OTOP).

2.2.3 Other Standard depending on Customers Requirements

2.2.3.1 Halal

Halal means any object made or action taken with its permission in compliance with Islamic law. Definition of Halal food, from National Bureau of Agricultural Commodity and Food Standards (2007), was food permitted in

compliance with Islamic Law, including other objects with the same meaning and full qualifications in conformity with requirements described in this standard. The criteria for the use of the word 'Halal' had been covering sources of permission food for consumption, slaughtering, preparation, processing, transportation and storage, Najis Purification which means a thing or a process that could ritually purify things/persons regarded as ritually unclean (najis), food hygiene, packaging materials and packing, advertising/distribution and marking/labeling. Its practices had to be complied with Islamic law.

2.2.3.2 ISO 14000

ISO 14000 standards were practical tools which provided a holistic approach to address the environmental management needs of organizations in public and private sectors. It could lead to benefits obtain such as reducing waste management costs and distribution costs, saving in consumption of energy and materials. Last but not least, implementing the ISO 14000 would gain an advantage of increasing marketing opportunities since nowadays environmental awareness amongst consumers continues to grow (Baxter, 2004.)

As discussed above, we would see how importance of food safety and quality was. Many of safety-quality food standards were established in order to assist stakeholders in the food chain to ensure their hygienically operations. Currently more complex of food chain was occurred and it led to the increasing of food contamination opportunities. Since SMEs were one of the major sufficient resources supplies, they should be in the focus of strengthening food quality and safety. However, before the managerial aspect would be introduced to SMEs for obtaining the quality and safety food, which would be convey to the fulfillment of customer satisfaction, the awareness of the food safety and quality importance should be established.

3. Tools for Marketing Research

3.1 Clustering Technique

Segmentation was one of broaden marketing strategies which helped marketers to identify and group the varying customers demand (Dey *et al*., 2011). In order to fulfill customers' satisfaction effectively, clustering technique should be chose properly. It classified a large number of observations along multiple variables (Ketchen and Shook, 1998, 453 cited in Lim *et al*.2006) into two or more mutually groups. Members of the same group share properties in common (Stockburger, 2006) and objects in different groups were different.

Main groups of the clustering techniques were hierarchical and non-hierarchical clustering. Dey *et al*. (2011) stated that hierarchical methods were less suitable for market segmentation because there is no reason to expect the market segments to have a hierarchical structure. In non-hierarchical methods e.g. K-means, an iterative partitioning algorithm was used as it does not impose a hierarchical structure (Budayan, 2008, cited in Dey *et al*. 2011). Furthermore there was ability to handle large amounts of data and take less calculation time than Hierarchical method (Kanlaya, 2005; Dey *et al*., 2011)

The K-means algorithm was first determine the number of clusters K. Then the algorithm selected a cluster center (cluster means) and assigns each observations to the particular cluster based on its smallest distance to the cluster mean. Distance measurement in the K-means algorithm was the squared Euclidean distance, which was the sum of the squared differences over all of the variables as formula shown (Böcker, 2004; Dey *et al*., 2011)

$$d_{ij} = \sum_{k} (X_{ik} - X_{jk})^2$$

d_{ij} = Euclidean Distance between object i and j

Screening the data for outliers and removing them from the initial analysis was recommended since K-means clustering was very sensitive to outliers. Outliers would usually be selected as initial cluster centers which would result in outliers forming clusters with small numbers of cases.

Therefore, K-means clustering technique was applied in this research to segment SMEs based on their food safety and quality knowledge. In order to approve whether difference food safety and quality awareness level implied difference SMEs profiles, different influent factors on the food quality and safety system appliance and SMEs training needs.

3.2 Focus group

Focus group was a qualitative technique that collects data through group discussion of group participants over topics determined by the researcher (Wittaya, 2010). This methodology was different from quantitative survey methodology in its purposes, procedures and results. Well-run focus groups provided more profound information than personal interviews or survey since a group dynamics lead to more developed answers than any individual respondent might supply (Office of Quality Improvement, 2007). It provided the production of insight since it enabled the researcher to observe emotions, contradictions and tensions of the key informants apart from the content of focus group discussions (Grudens-Schuck *et al*., 2004). Furthermore, this method had been used in pre-pilot work for providing a contextual basis for survey design, formulating appropriate questions for survey and used to provide an interpretative to survey finding. However, among the advantages of focus group conducting, there were list of limitations such as it might be difficult to recruit the key informants (target participants), ability of moderator would effected the research quality as well as the number of participants in the group or the group size.

In general, focus group consists of six to twelve people with similar characteristics to a single session. Gavin (2008) suggested size of focus group should not be any larger which might be difficult for researcher to analyze and hardly to manage. However, small of the group size might not generate enough discussion.

Convenience sampling could be used in order to select participants for a focus group. In addition, Grudens-Schuck *et al*. (2004) stated that the quality of the data would be decreased if a group had been conducted with highly different characteristics. Therefore it was necessary to conduct multiple sessions to understand the perspectives of a different group of people with had discussed over the same topic. Effective focus group session should not be lasted over 150 minutes (Wittaya, 2010).

Questions used in the focus group, should be open-ended and moved from general to specific. During the discussion, questions which go beyond the objectives might arise. Therefore, baseline discussion guide should be developed in order to facilitate moderator to maintain focus of the group on the issues of objective topic.

Reporting the results from focus group should not present via statistics as it would lead readers to believe that statistics results were true for a much wider population.

4. Related Research

According to literature review, 3 aspects of all related research found as follow: marketing research method, food safety awareness and factor affecting food quality and safety system application and small and medium enterprise.

4.1 Marketing Research Method

Questionnaire was the powerful tool of the survey research for collecting primary data. Wording and format of questionnaires, together with content and sequencing were all the important steps since it could effect to the quality of research. Initially, as researcher would like to assess awareness or knowledge, it was considered to measure what respondents know as well as what they do not know. Several research allowed ‘do not know’ option in the question format (Ciochetto and Haley, 1994; McCarthy *et al*., 2007). In order to help respondents feel comfortable reporting ‘don’t know’ rather than guessing. Moreover, framing a question about knowledge in terms of an opinion question could also encourage respondents to answer what they know

(Sudman and Bradburn, 1982). For example, McCarthy *et al*. (2007) who examined knowledge levels about food safety practices, food safety and food science amongst the population of Ireland (n=1025). They used series of statements related to these issues and the respondents had to indicate if the statement correct/incorrect or do not know. According to the clustering technique, Piyatida (2009) found K-means clustering analysis was the most effective algorithm although the sample size and number of variables had been changed in all dataset. To determine the appropriate number of clusters, meaningfulness and interpretability of each solution was considered (Kanlaya, 2005; Lim *et al*., 2006).

4.2 Food Safety Awareness and Factor affecting Food Quality and Safety System Appliance

There were positive association between knowledge and awareness of food safety as cited by Marut (2005) and Pattaralak (2005). Demographic factors such as age, education level and perception of food safety benefits influenced on food safety knowledge and awareness level (Marut, 2005; Pattaralak, 2005; Narawan, 2006).

Although food safety was of crucial important to the consumer and food industry (JevŠnik *et al*., 2008), there were still many studies about difficulties in adopting of food quality and safety system in SMEs. For example, results from Iffour (2003) reported that lack of clear advantages of having the quality system would be one of the mind barriers for SMEs to obtain successful in food safety and quality management. This was in agreement with Baş (2007) who indicated that the lack of understanding was one of the main difficulties to food safety programs implementation including the feeling of potentially insurmountable. These might cause of insufficient/poor knowledge of food safety principles, unclearly understanding in concept of good practices and the necessity of documentation in food industries which were mentioned by Raspor (2008) and Karipidis *et al*. (2009), together with lack of awareness of food safety issues among food workers (Yapp and Fairman, 2006; Raspor, 2008).

The affording factors for adoption quality system would be positioning in the market place of SMEs business, the effect of poor quality, the quality culture and the effectiveness of activities aiming to achieve quality goals (Karipidis *et al*., 2009). Furthermore, Tannock *et al*. (2002) stated that the factors related to successful for the development of total quality management (TQM) among Thai SMEs was connected to management awareness and knowledge, effective information systems and the lack of Thai language quality management materials. Moreover, Karipidis *et al*. (2009) indicated that the lack of a professional quality office and the characteristics of a company could affect the decision of quality assurance system (QAS) adoption. Deeper results had been identified from Yapp and Fairman (2006), in which lack of trust in food safety legislation, lack of motivation in dealing with food safety legislation were the main barriers apart from money and time. Furthermore, they had mentioned about the adoption of approaches variety from enforcing officers that need to be accomplished for increasing the levels of understanding, motivation and trust.

Badrie *et al*. (2005) reported on their study about consumer awareness and perception to food safety hazards in Trinidad. They found that any genders should be targeted for food safety education programmes and the effective public education programmes which focused on microbiological, chemical and physical food risks were essential.

4.3 Small and Medium Enterprise

According to survey results from the National Statistical office (NSO) in 2007, indicated that most of people were in doubt in the quality of products. When viewing from local community members in the challenges of operating the community enterprises, they found that financial accessibility was the major barrier, follow by the market inaccessibility and lack of knowledge especially in production technology.

Teerasak *et al*. (2009) stated in their studies about characteristics and marketing management of the retailing community businesses, that family managing style might cause ineffective systems in their operation. They suggested that

government sector had to deeply understand about the SMEs' operation model in each community in order to plan and establish policy for meeting their needs.

The study of capacity building requests from entrepreneurs in four industrial sectors; food, furniture, plastic and ceramic, which was done by OSMEP (n.d.), revealed that short training courses such as workshop need to be developed for encouraging the participation of attendants, together with individual counseling and continuous evaluation after training. Financial management, human resources, strategic management and marketing, tax and related law/regulation, industrial technology in term of production management, quality management were the programs that they would like to be held.

MATERIALS AND METHODS

Materials

1. Questionnaires
2. SPSS Program version 16.0 (SPSS (Thailand) Co., Ltd)

Methods

This research used a multiple-methods approach, qualitative and quantitative, to assure the research validity. The first stage was by quantitative methods, using food products survey for food product categories. Then data on food safety-quality awareness among SMEs were collected using questionnaire and statistic methods for analysis purpose. At last, focus group with the food entrepreneurs and food SME related organization had been conducted. All results from both qualitative and quantitative section were then used as an input of strategic plan for Thai SMEs capacity enhancing.

1. Current trends in the processed food market from SMEs in Thailand

1.1 Marketing survey on food product from SMEs

SMEs products survey on shelves was conducted as the first study step, for obtaining information on current trend of SMEs processed food market and studied the SMEs products pattern technology base. To discover whether different products commodities based performed dissimilar of awareness level among vary of raw material based. For proceed the survey, four types of retail stores, supercenter, supermarket, specialty store and convenient store in Bangkok area were chosen. It represented the differences of the distribution channel.

2. Studying SMEs profile, assessing their awareness toward quality and safety appliances, its influenced factors and capacity building request

According to product classification found from survey, association between product commodities and SMEs food safety and quality awareness level was studied. Consisting with the objectives, the questionnaire not only used to assess the SMEs awareness level but also applied to collect data of incentive factors to the food safety and quality appliance among food SMEs and their capacity building request.

2.1 Questionnaire design

The questionnaire presenting in appendix A was divided into four sections.

2.1.1 The first part was collecting the business owner education, business profile; business operation model, enterprises's size and income.

2.1.2 The second was formatted as tables of 28 statements of food safety understanding concept assessment. Respondents would be asked for indicating how their opinion was toward food safety and quality assessing statement based on a six-point rating scale. Each statement could represent a discrete concern and could yield a score specific to that concern (Henerson *et al*., 1978). Therefore, their food safety and quality awareness could be assessed, according to positive association between knowledge and awareness of food safety found (Marut, 2005; Pattaralak, 2005). In addition to six-point rating scale, it was applied from five-point rating scale with having an explicit 'don't know' response, in purpose to offer choice for respondents who do not know the answer to a question (Ciochetto and A. Haley, 1994; McCarthy *et al*., 2007). Consequently, optimizing responses based on their individual's attitude rather than by guessing could be obtained (Ciochetto and A. Haley, 1994). Having rules for calculation each statement scoring obtained as followed:

Table 4 Scoring Rule

	Positive Questions	Negative Questions
Strongly agree	5	1
Agree	4	2
Neither agree nor disagree	3	3
Disagree	2	4
Strongly disagree	1	5
Don't know	0	0

Source: Adapted from Marut (2005); Henerson *et al*. (1978: 86-87)

Responses would be scored differently depending on whether the statement reflects a positive or negative attitude (Henerson *et al*., 1978). If any food safety knowledge statement was an incorrect statement, the response on that statement would be scored as negative questions.

2.1.3 Similar format as the second part, the third part SMEs were scored to each statement for assessing the incentive factors for food safety and quality system adoption in their business based on a six-point rating scale.

2.1.4 The last section of the questionnaire was a ranking question related to capacity building requested from SMEs. This part required respondents to evaluate top three from seven training programmes; processing technology, quality and safety food management, decision support system, financial management, food marketing, supply chain management and law/regulation related to food products, based on their actual needs.

Content validity and wording of the statements were reviewed and revised on comment of the food quality and safety system professional. The questionnaires were pre-tested by 29 food SMEs during August 2010 to confirm clarity, identify response option. Reliability measurement via Cronbach's alpha was used to assess the internal consistency of variables or average correlation of items in a survey instrument

(Reynaldo and Santos, 1999). The results showed the Chronbach's alpha was 0.776, indicating an adequate scale. If reliability coefficients of 0.70 or above, questionnaire were respectability considered (Henerson *et al*., 1978).

2.2 Sample size determination for observation number

In terms of the scope of the population, researchers limited the target population of this study to the population of food small and medium enterprise. Using Yamane formula to calculate sample size as follows:

$$n = \frac{N}{1 + Ne^2}$$

Representing

n	=	Sample size
N	=	Population size
e	=	Level of acceptable variation

According to the data from OSMEP, number of food SMEs in 2008 were 157,224 enterprises. The researcher specified the level acceptable variation as 0.10. Therefore the number of sampling at least 100 needed to be collected to represent of the population as calculating shown below:

$$n = \frac{157{,}224}{1+157{,}224(0.10^2)} = 100$$

2.3 Observation Source

About half of questionnaires were approached through the customers of bank for Agriculture and Agricultural Cooperatives, as this distributed channel directly associated with locally producers throughout the country. For the rest of the target sample were then distributed to the other channels such as Institute for Small and Medium Enterprises Development (ISMED), Department of Business Development.

2.4 Data Analysis

This study reported on a quantitative research. SPSS version 16.0 statistical program was used for all analysis.

2.4.1 Descriptive statistics were used to describe personal and business profile of respondents in form of percentage, frequency, mean and standard deviation.

2.4.2 Cluster analysis was applied as this technique classifies a large number of observations along multiple variables (Ketchen and Shook, 1998,453 cited in Lim *et al*., 2006). K-means clustering method was conducted since its ability to handle large amounts of data and take less calculation time than Hierarchical method. (Piyada, 2009; Kanlaya, 2005; Dey *et al*., 2011). Scores obtained from respondents opinion toward 28 statements of food safety understanding concept assessment was assigned as input to cluster observations. In deciding between a two and a three-cluster solution, based on their knowledge of food safety and quality, interpretability of each solution would be considered (Kanlaya, 2005; Lim *et al*., 2006).

2.4.3 After the SMEs were classified into groups, descriptive statistics were used to describe the means score of 28 statements of food safety understanding concept assessment from each different group. Then the means score of different groups of respondents were compared for the statistical difference in order to reconfirm the numbers of clusters suggested by clustering analysis (Jackson, 2009).

2.4.4 Cross tabulations and the Chi-square test were used to describe the profile of such groups.

2.4.5 Analysis what incentive factors effected food quality and safety appliance, based on the awareness of each group, would be done. One Way Analysis of Variance (ANOVA) was used to test if scores of respondents' opinion toward each incentive factors were alike. Then, using Duncan's Multiple Range test to indicate what incentive factors effected safety implementation for each group of awareness. The normality assumption, the constant variance assumption, the outliers and the

block-treatment interaction assumption needed to be approved for affirming analysis' reliability.

2.4.6 Descriptive analysis was used to summarized for the capacity building request based on their awareness level group.

3. Focus Group

3.1 Seminar arrangement

Seminar 'Important of Product Quality and Safety Awareness Concerned for Thai Food SMEs' was initially arranged to provide an overview of the current trend in the processed food market and its influence to all relevant components in the supply chain. Since this was a one key success in strengthening capacity and competitiveness of each food SMEs.

3.2 Focus Group of food SMES

Focus group was conducted in order to access the limitations and needs for capacity building according to food business groups, classified from the survey in the previous part. Moreover, it would be benefits for further creating a training plan for enhancing the Thai food SMEs capacity. Its result would give the researcher the clearer aspects about acquisition training program and relevant needs. The target participants for this activity were SMEs, in which included both individual and cooperative business model, certified body and government related. Grouping was based on awareness level of food safety and quality in each participant, which was assessed from the questionnaire and made up of vary product commodities business. Each focus group had six to eight participants and each focus group lasted about 90 minutes. All interview contents were then analyzed for training program of enhancing food SMEs capacity building in further activity. Focus group procedure was shown in figure 1.

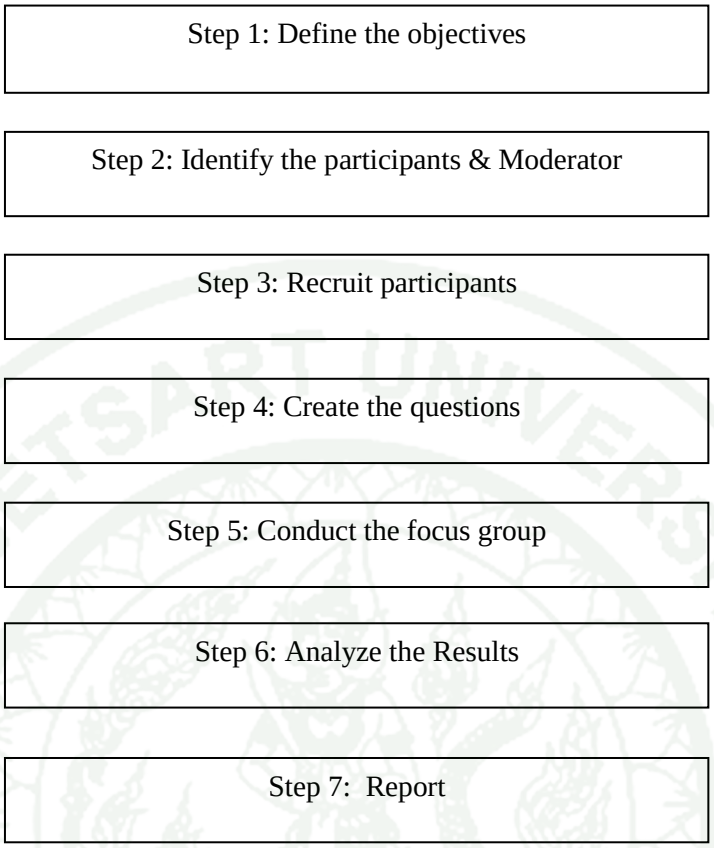

Figure 1 Summary of focus group procedure

4. Training Program for enhancing SMEs capacity

Extracted information from both primary, which obtained from questionnaire analysis, secondary data and content analyzed in focus group to create a training program for SMEs capacity enhancing.

RESULTS AND DISCUSSION

1. Survey on Food products from SMEs

The survey for food product characteristics on shelves of retail stores were conducted from January to June, 2010. 195 product items from SMEs found from 19 branches of four retail store types; five branches of three different supercenters, six branches of three different supermarkets, two specialty stores and six convenient stores.

It revealed five categories material based available; fruit/vegetable, fish/seafood, meat/poultry, milk and grain. In figure 2, nearly half of products from SMEs found were in the fruits and vegetables processed basis, followed by the grain products which include flour mill. Fruit, vegetable and grain were the majority parts of food SMEs in Thailand because such products had a variety of raw material available. Together with several processing, many forms of these raw materials product based available such as fruit chip, infused dried vegetables, fruits pickle. For other type of raw material like fish, meat or milk, it turned out that many of these various products had great similarities basically from the ingredients used. Food SMEs used fish, meat and milk as raw material together were around 30%.

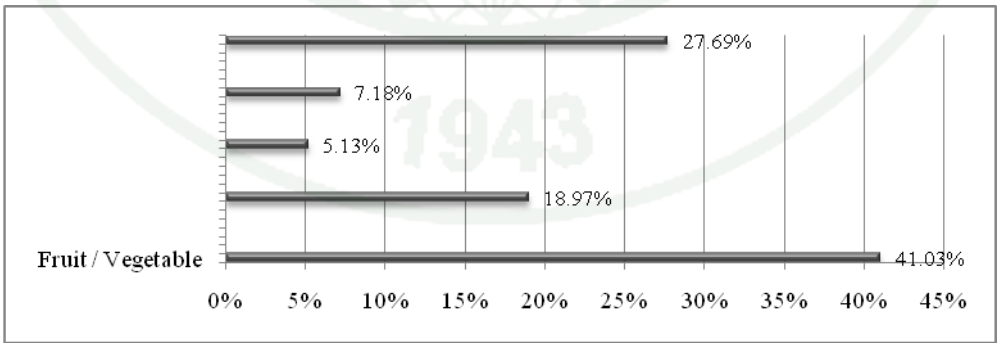

Figure 2 Proportion of food SMEs products based on types of raw materials

Five SMEs product commodities found from survey was assigned as target sample for survey by questionnaire for SME owners' product food quality and safety

awareness assessment. Figure 3 presented food product from SMEs based on their raw materials and processing technology. Viewing from the processing technology, fish and meat were likely to be processed as meat floss and fermented sausage. Freezing and vacuum packing were rarely to see because of high in capital processing. Noticeably, most of SMEs products were processed by dehydration and evaporation techniques as presented in figure 4.

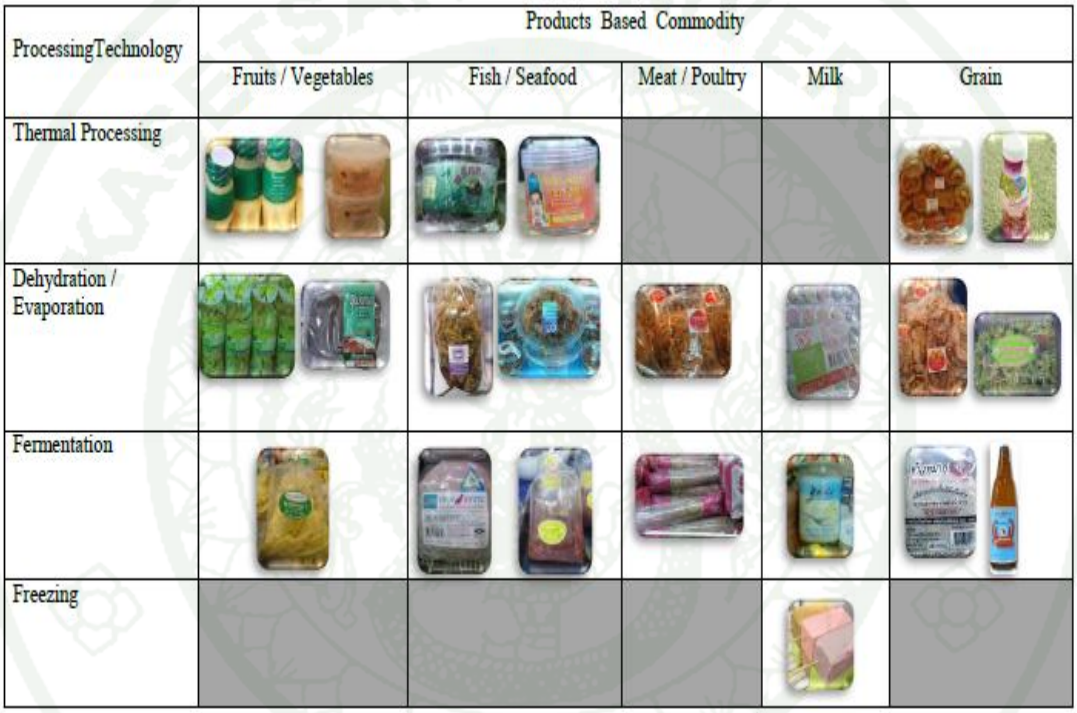

Figure 3 SMEs food products from retail stores survey in Bangkok during January– June 2010

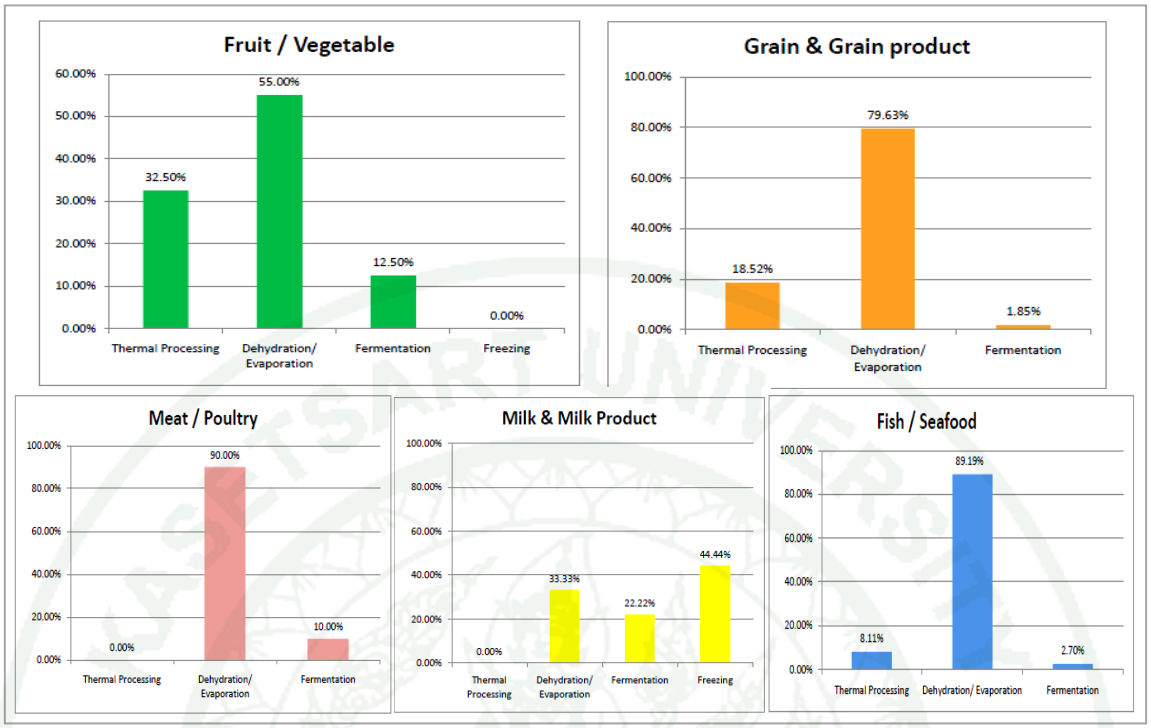

Figure 4 Estimate proportion of SMEs product items based on processing technology

Moreover, as each product commodity represented different in business economic value. For example, fish/seafood processed company would create more in business economic value than fruit/vegetable processed company. Consequent to the hypothesis of different product types might influence food safety awareness level which would be proved through the questionnaire.

2. Questionnaire survey Food SMEs owners in Thailand

With the purpose of survey all five SMEs product commodities; fruit/vegetable, fish/seafood, meat/poultry, milk and grain, found from survey. Questionnaires were approached through the Bank for Agriculture and Agricultural Cooperatives, Institute for Small and Medium Enterprises Development (ISMED), Department of Business Development and local market. As these distributed channels directly associated with locally producers throughout the country. The total 209 questionnaire responses were collected with 0.07 level of acceptable variation (e) according to Yamane formula. Analysis on respondents' profile, cluster respondents based on their awareness level in

order to identify each profile' group, incentive factors for the adoption of food safety and quality system and capacity building request was done sequentially.

2.1 Profile of observations

209 SMEs Respondents' profile was summarized in Table 5. About half of respondents had less education than bachelor's degree. Around 59% of SMEs owner were cooperative business model. Most of them were small enterprises with less than 15 employees.

Table 5 Respondents profile (n=209)

Characteristics	Percentages
Education level of business owners	
Less than Bachelor's degree	53.1
Bachelor's degree	30.1
Higher than Bachelor's degree	16.7
Business Operation Model	
Individual	41.5
Cooperation	58.5
Enterprises' Size (Employees)	
Less than 15	40.9
16-25	24.1
26-35	5.4
36-45	4.4
46-55	1.5
56-200	23.6
Business monthly income (Baht)	
Less than 30,000	42.7
30,000-50,000	12.5
More than 50,000	44.8

Table 5 (Continued)

Characteristics	Percentages
Perception of food safety and quality	
Had received information	84.1
Had not received information	15.9

2.2 Quality and safety awareness assessment

K-means cluster based on their 28 statements of food safety understanding concept scores was analyzed. In deciding between a two and a three-cluster solution, due to number of cases of two-cluster offered more appropriate proportion, a two-cluster solution was chose. The first group named 'High awareness' consisted of 115 respondents (55.02%) while the rest of respondents were assigned in the second group named 'Low awareness'. Independence t-test analysis was used to reconfirm the means score of 28 statements of food safety understanding concept differentiation of two groups. Statistical test indicated having significant difference at 0.05 as presented in table 6. High awareness group had average food quality and safety knowledge score 3.87 which more than another segment in every aspect. The low awareness segment had average score of 3.56.

Table 6 T-test of mean score on food safety and quality between high and low awareness group

Group			t-test for Equality of Means		
	N	Mean	t	df	Sig. (2-tailed)
High Awareness	115	3.87	8.459271	207	.000
Low Awareness	94	3.56			

The 28 statements for assessing awareness of food safety and quality had been categorized into four groups' issues concerned. First issue that should be focused on was the microbiological concept as both groups obtained such low score. Followed

by the understanding of the certified label, important of the process certified system and the misunderstanding on hygiene practice in raw material preparation.

However, for the microbiological contamination concept, both high and low awareness group still had unclear understanding. Both groups got score less than 3 from 5. Example of food safety and quality concept with both groups shown unclear understanding were presented in figure 5. This was in agreement with statement from Mayes and Mortimore (2001), in which the lack of microbiological knowledge was particularly a problem for SMEs.

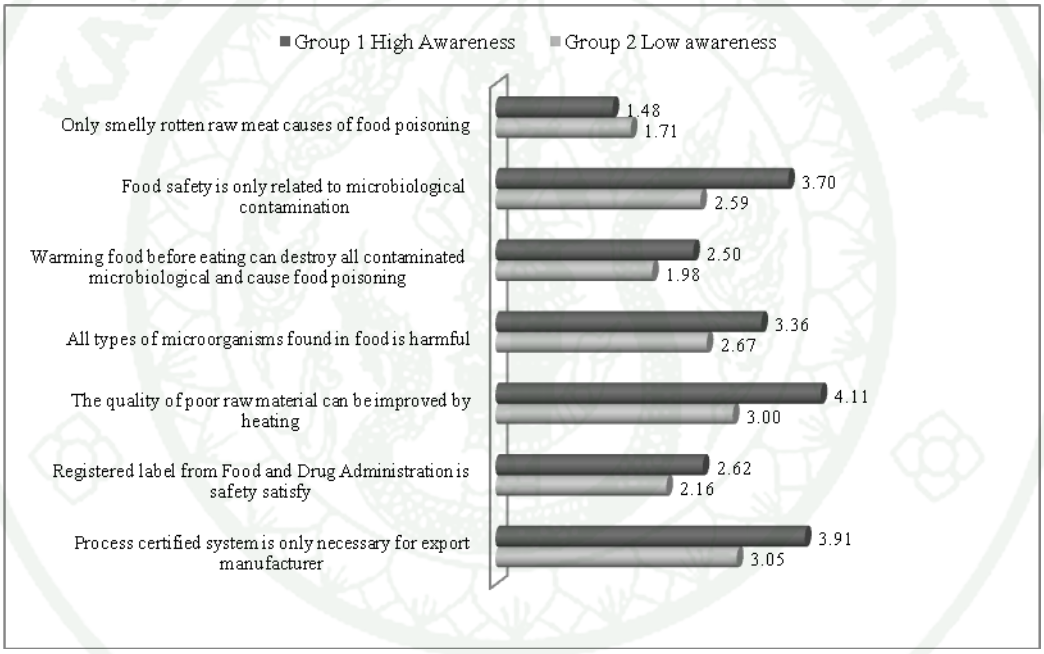

Figure 5 Mean scores of food quality and safety awareness

In order to describe the profile of such groups, chi-square test and cross tabulations were applied. Karipidis *et al*. (2009) suggested characteristics of a company such as the kind of products business produces may affect determining the adoption decision. Surprisingly, business' products based on its raw material which represented different in business economic value had no association with food safety and quality awareness level as presented in table 7.

Support SMEs business owners education level might increase awareness on food safety and quality. As we found significant relative between education level of business owners and food safety knowledge, in which high awareness group had bachelor's degree and low awareness group finished high school or lower. This had been in line with many studies (Marut, 2005; Pattaralak, 2005; Narawan, 2006).

Furthermore, business operation model, enterprises' size and income had also influence on awareness of food safety and quality. High awareness segment represent the large enterprises that earned more than 50,000 baht per month. Majority of sampling in the low awareness segment were cooperative business and small enterprises which had monthly business income less than 30,000 baht.

Table 7 Comparison percentage respondents of each segment profile

Profile	Group 1 High Awareness Group n = 115	Group 2 Low Awareness Group n = 94	Significant (P-Value)
Education level			< 0.05
<Bachelor's degree	35.9	75.9	
Bachelor's degree	38.8	20.7	
>Bachelor's degree	25.2	3.4	
Business Operation Model			< 0.05
Individual	57.3	14.9	
Cooperation	42.7	85.1	
Enterprises' Size (Employees)			< 0.05
Less than 15	31.1	51.7	
16-25	18.4	33.3	
26-35	5.8	4.6	
36-45	5.8	3.4	
46-55	1.0	2.3	

Table 7 (Continued)

Profile	Group 1 High Awareness Group n = 115	Group 2 Low Awareness Group n = 94	Significant (P-Value)
56-200	37.9	4.6	
Business monthly income (Baht)			< 0.05
Less than 30,000	2.9	87.4	
30,000-50,000	13.6	12.6	
More than 50,000	83.5	0	
Business product type			**0.566**
Fruit/Vegetables	38.0	42.9	
Fish/Seafood	11.3	12.9	
Meat/Poultry	18.3	10.0	
Grain /Grain products	32.4	34.3	

2.3 Factors influencing appliance of food quality and safety system in SMEs

Analyzing the difference of mean scores responses toward incentives factors for the adoption of food quality and safety system in each group with One way analysis of variance (ANOVA). Duncan's Multiple Range test was applied in order to rank such factors. The reliability of results analysis had been approved. Table 8 and table 9 presented ranking of incentive factors to food quality and safety system appliance in high awareness and low awareness group respectively.

Table 8 Incentive factors to the appliance of food quality and safety system for high awareness group

Factors	Group 1 High Awareness
Social Responsibility	4.45a
The differentiation of products	4.33b
Law/Regulation	4.29b
Establishing business image	4.20b
Budget	3.82c
Customers concerned on quality certified products	3.00d
Sales increasing	2.38e

Table 9 Incentive factors to the appliance of food quality and safety system for low awareness group

Factors	Group 2 Low Awareness
Social Responsibility	4.21a
Budget	4.18a
The differentiation of products	4.14a
Establishing business image	3.95b
Law/Regulation	3.79bc
Customers concerned on quality certified products	3.38d
Sales increasing	2.84e

In high awareness group and low awareness group, social responsibility was the main factor for adopting food quality and safety system as mean score 4.45 and 4.21 from 5 respectively. Similar study showed that most of food SMEs was motivated to take action to comply with food safety requirements in order to protect

their reputation and their business from potential legal action (Yapp and Fairman, 2006).

Within high awareness group, market-driven, which can be implied by mean values of establishing business image factor, and regulation were more likely to be the important factors that affect food quality and safety appliances. It can be explained by the study of Spillan and Parnell (2006) in which it showed that market driven strategies were created when a firm becomes market-oriented. Another supporting report from Yapp and Fairman (2006), legal duty were one of the factors that drove the compliance in most of food SMEs.

The important of product differentiation, budget and social responsibility were the top three factors that faced low awareness group for adopting food quality and safety system with had no statistical significant different ($p>0.05$). According to the states from International institute for trade and development (2009), indicated that the access to the formal sector financing and difficult access to credits remains major impediment for many Thai SMEs.

From the other similar studies, Baş *et al*., (2007) found that the main barriers for food safety in food businesses were negative attitude and lack of knowledge toward food safety programs. Moreover, Yapp and Fairman (2006) also discussed in deeper details that money and time which were commonly cited barriers to food safety and quality compliance may conceal the deep-rooted issues; lack of trust in food safety legislation, lack of motivation in dealing with food safety legislation and lack of knowledge and understanding.

2.4 Capacity building request

For purpose of acquiring base information to further developing innovative capacity enhancing based on food SMEs awareness level, each training programmes frequency obtained was computed. It was important information as Karipidis *et al*. (2009) reported that lack of suitable training programs was one of the

discouragements found in the adoption of quality assurance system in small food enterprise.

As presented in table 10, high food safety and quality awareness group requested market oriented as the first order (31.3%) among seven capacity building programmes, processing technology, quality and safety food management, computer program for supporting business decision, financial management, food marketing, supply chain management and regulation related to food products. Table 11 presented percentage training request by low awareness segment, they needed more on training of the quality and safety food management. Similar study stated that training programs, both basic food safety and HACCP to support implementation of prerequisite programs should be introduced (Baş *et al*., 2007).

Table 10 Percentage training programs acquired by high awareness group

Training Programs	Group 1 High Awareness
Technology of processing	26.3
Quality and Safety food management	17.2
Computer Program for business decision	8.1
Financial management	5.1
Food marketing	31.3
Supply Chain management	2.0
Law/Regulation related to food products	10.1

Table 11 Percentage training programs acquired by low awareness group

Training Programs	Group 2 Low Awareness
Technology of processing	18.8
Quality and Safety food management	45.9
Computer Program for business decision	1.2
Financial management	10.6
Food marketing	17.6
Supply Chain management	4.7
Law/Regulation related to food products	1.2

3. Focus Group of Food SMEs

The focus group was mainly based on classification from the previous survey among food SMEs. Clearer aspects about acquisition training programmes and relevant needs were obtained. According to the food quality and safety awareness assessing, high awareness and low awareness group had been classified. Besides of the different groups had different business profile, capacity building requests were also individual. Therefore focus groups had been set according to such results. Table 12 and 13 presented the participants of high awareness group and low awareness group, respectively.

Table 12 Participants list of high awareness group

Business Type (Owner / Employees)	Profile
1. NFI (Food Management Certified body)	Auditor
2. Fish/Seafood Processed Processor	Cooperative Business Model
3. Thai Dipping Processor	Cooperative Business Model
4. Fruit/Vegetables Processed Processor	Individual Business Model
5. Grain and Grain Product Processor	Individual Business Model
6. Thai Dessert Processor	Individual Business Model
7. University	Training and Research Service Unit

Table 13 Participants list of low Awareness group

Business Type (Owner / Employees)	Profile
1. Research center of Bank for Agriculture and Agricultural Cooperatives	Government Research Officer
2. Vegetables Processed Processor	Cooperative Business Model
3. Fish/Seafood Processed Processor	Cooperative Business Model
4. Meat Processed Processor	Cooperative Business Model
5. Grain and Grain Product Processor	Individual Business Model
6. Grain and Grain Product Processor	Individual Business Model
7. University	Training and Research Service Unit

Focus group revealed that two different in awareness level groups represented different attitude toward their business operation, their business model, barriers in food quality and safety system adoption and aspect of different issues concerned for each groups.

Discussion over the capacity building request had been in line with the previous survey, in which the high awareness group acquired the marketing-oriented knowledge. After the consistency of products and food quality had been ensured. They felt like this subject could build their business image. Experience of expanding their business into retail-store was recorded. Such high cost such as listing fees, special occasion's fees would be one of barriers for food SMEs to deal with. Caused from had no explicitly agreement in some details such as the uncertainty of retail regulations. Furthermore, most of participants recognized that, a growing number of retailers and wholesalers were influence to their operation especially safety and quality food products concerned. Supporting reported from Henchion *et al*. (2005), most of enterprises faced similar difficulties in getting their product from their region to the market caused from the main supplier selection criteria were not only personal relationships and location of supplier but also included food safety issues and products quality. Therefore, it would be advantages for SMEs in this group, if the impact of modern trade strategies to the food SMEs survival based on their product

characteristics would be further studied. Addition with difficulty of food SMEs to expand their market through currently modern distribution channel.

Comparing to participants in low awareness group, training of the food quality and safety were request at first step. It might be caused by their business cycle which was just in the introduction period. They thought food quality and safety had no beneficial to their business growth. It might be because of their attitude towards business operation was short term or focus on gaining profit. Consequently, their production and operation were rarely to conform to the quality system. In another words, awareness might not enough to drive them to establish food safety and quality managerial, which required law enforcement.

Similarity in both groups, many food processors currently had to undergo many food management certified system based on different standards, no universally recognized standard for food products/operation from their points of view. Additionally, they found their products were overwhelming with various food standards undertaken by several organizations.

Interestingly, majority of the participants suggested that cooperation with food SMEs, which had the similarity raw material based and intensifying cooperation with government, should be accomplished. Together with studying and comparing policies establishment from each SME supporting agents in order to understand and evaluate whether current policies were duplicated. Results in government can easily obtain the right information in order to support SMEs in various aspects effectively.
A summarized issue found from focus group was presented in table 14 as follow:

Table 14 Summarize business characteristics and its challenges

Awareness Level	Business Characteristics and its challenges
Low	• Less aware of the importance of product safety and not sure if it can be the affect factor for the long-term business operation. • Their attitude toward quality and safety system was, complication of the systems and no beneficial effect on their business • Although food quality and safety were aware, there were still lack of fundamental of food safety and hygiene. Consequently, their business operation was rarely to conform to the quality system.
High	• View point toward food safety was food that frees from all hazards that beginning from raw material to consumers, throughout supply chain. • Food quality and safety was the importance factor for their sustainable business development. Further with understanding of food quality and safety on consumer acceptance. • Proud of their brand and needed a sustainable business. • Market-driven were likely to be the important factor that affect food quality and safety appliances and production-capacity expansion within this group • Modern food supply chain had influenced on their decision about expanding their business to retail-store. After deciding to expand the business, financial management, inventory management and business risk management are acquired later. • They found hardly to distinguish various food standards. • Uncertainty of retail regulations, high costs of supply product to the retail stores market such as listing fees, special occasion's fees. Such high cost would be one of barriers for food SMEs to deal with as there was no explicitly agreement in some details such as listing fees.

4. Training program for enhancing SMEs capacity

Training program for capacity enhancing of Thai food SMEs was extracted from survey by questionnaire, content analyzed in focus group and literature review.

According to SMEs products survey on retail-stores shelves, five products categories based on its raw material was classified. Together with, awareness assessment, by questionnaire, approved no association between SMEs product commodities and SMEs food quality and safety awareness. It was clearly to state that food safety and quality awareness among food SMEs were independent and had not depending on their business' products. Different in food safety and quality awareness were influenced from business owner education, business operating model, enterprises' size and business income. Therefore, we would conclude that the different entrepreneurs profile represented different awareness level of food quality and safety. As the results of survey and focus group indicated, capacity enhancing program should be imposed differently depending on the awareness level. Therefore "strengthening food SMEs through semi-tailor made capacity enhancing program strategy" based on SMEs awareness level was planned.

Having sufficient and effective knowledge were one of the main perspective to the successful business from SMEs point of view (OSMEP, 2010). To fulfill their successful approach, such training program, which based on diagnosed through their business profile and awareness evaluation, should be planned as a long term training program corresponding to the business growth. Figure 6 presented the capacity enhancing program for food SMEs.

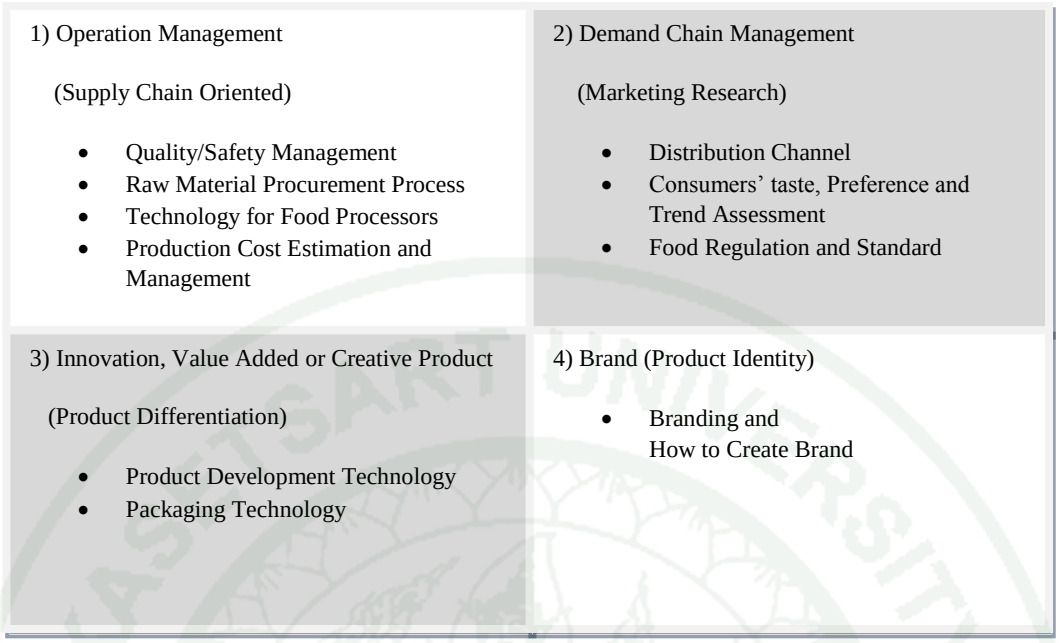

Figure 6 Training programs for strengthening food SMEs

This set of training programmes would convey a specific set of skills which matching with appropriate person based on their profile. It could be tailored and deployed to targeted group of food SMEs. These programmes were in line with the study of OSMEP (n.d.), which stated that industrial technology in term of production management, financial management, human resources, strategic and marketing management should be held in order to response to SMEs capacity building demand. However, it was essential that Thai food SMEs should improve themselves by starting with having clear perception on their fundamental problems.

For example, microorganism concept should be knowledged initially to improve the basic concept of food quality and safety understanding for all food SMEs, according to the survey result. Then SMEs, who had high level in food safety and quality knowledge, demand chain management programmes together with branding program should be deployed.

In order to facilitate the custom made training program development, university and SMEs related agencies and institutions such as OSMEP, ISMED should cooperate for enhancing SMEs capacity continuously. In addition to this strategy, government

sector had to explicitly understand about SMEs' operation model in each commodity in order to plan and establish policy effectively (Teerasak *et al*., 2009). Consequently, SMEs operation consistency could be maintained and even develop technologies in their production as well as expanding market accessibility and creating product differentiate.

Furthermore, visualization of Thailand food related SMEs' training history could be easier with database developing. This was in agreement with the statement of Trirong, Deputy Prime Minister, in which database that aggregated information of SMEs in Thailand would be an advantage for approaching the holistic SMEs supporting policy (ASTV Manager Online, 2010).

CONCLUSION AND RECOMMENDATION

Conclusion

The information obtained through all activities in this study had been drawn as follow:

The increasing of consumers awareness in product quality and safety, subsequent to it was become the basic requirements for customers (Tabai and Salay, 2003; ProchÁzka, 2007; Briz and Ward, 2009). Food SMEs processors were also one of the main role to produce and distribute such products to fulfill satisfaction of customers. Nowadays there were five product categories based on its raw material found available in the market which consisted of fruit/vegetable, fish/seafood, meat/poultry, milk and grain. The majority products from food SMEs were fruit/vegetable based. Dehydration and evaporation were the processing techniques used by most SMEs as its using less in capital processing.

Having two food safety awareness levels; high and low awareness group, which was different in profile of education, business operation model, enterprises' size and income. Different in product types produced from SME had no association to the food safety understanding concept.

The approach to successful food SMEs in safety and quality management would obviously vary by awareness level on food safety and quality assurance implementation in their production. Market drive was the incentive factor which affected to food safety and quality system adoption among high awareness group, apart from social responsibility. Interestingly, incentive factor to low awareness group of food quality and safety appliances was firm's productive capacity, current products rather than market forces like high awareness group.

The another finding key from this research, was properly opting innovative training to appropriately resolve difficulty and limitation among SMEs. As the survey

results indicated, acquirement of capacity building should be imposed differently depending on the awareness level. In high awareness group which food product quality and safety including products consistency had been ensured, knowledge on the marketing-oriented was requested consequently. Since market drive was the important factor to food safety and quality adoption among high awareness group, it might noticeable influence to their marketing training request as the first order. On the other hand, low awareness SMEs perceive aspect of quality and safety food management, processing technology were their initially capacity building programmes.

Finally, "strengthening food SMEs through semi-tailor made capacity enhancing program" based on SMEs awareness level should be established. In order to propose the suitable skill sets to appropriate food SMEs based on their profile. This would be very useful information for the SMEs facilitators to perceive which groups of entrepreneurs should be prioritized for the supporting scheme. However, the continuous development of food SMEs could be achieved if cooperation from SMEs supporting organizations had been done in a holistic and systematic approach.

Recommendation

In this research, grouping food quality and safety awareness based on statements of food safety understanding concept. Its assessment was a subjective evaluation that depends on researcher. Therefore it would be useful for long-term apply if standard of food safety and quality awareness assessment was established. It should be developed in form of integrated test that considered content, proportion of each question and score criterion. Moreover, the seriously action of the related organizations for implementation a training program as recommend would create broader positive impact to Thailand development.

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APPENDICES

Appendix A

Questionnaire

ชุดที่.....

แบบสอบถาม

ความตระหนักในความปลอดภัยของผลิตภัณฑ์อาหารพร้อมรับประทาน

แบบสอบถามชุดนี้จัดทำขึ้นโดยมีวัตถุประสงค์เพื่อศึกษาความตระหนักในความปลอดภัยและคุณภาพในผลิตภัณฑ์อาหารพร้อมรับประทานของผู้ประกอบการ SMEs ในประเทศไทย และ เพื่อเป็นแนวทางในการจัดหลักสูตรการฝึกอบรมในด้านต่าง ๆ อีกทั้งยังสามารถใช้เป็นแนวทางในการพัฒนากลยุทธ์ช่วยยกระดับ SMEs ในระยะยาว

ข้อมูลที่ได้ทั้งหมดจะนำไปเป็นแหล่งข้อมูลพื้นฐานทางวิชาการแก่ผู้ที่สนใจทำการศึกษาต่อไป โดยมิได้มีจุดประสงค์เพื่อประโยชน์ในเชิงพาณิชย์ คณะผู้จัดทำใคร่ขอความร่วมมือจากท่าน กรุณาตอบแบบสอบถามให้สมบูรณ์ตามความเป็นจริงโดยใช้เวลาประมาณ 10 นาที ขอขอบพระคุณทุกท่านในการให้ความร่วมมือ ณ โอกาสนี้

คำชี้แจง แบบสอบถามนี้ประกอบด้วยชุดคำถาม 4 ส่วน

ส่วนที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

ส่วนที่ 2 การวัดระดับความรู้และความเข้าใจเกี่ยวกับคุณภาพและความปลอดภัยของอาหาร

ส่วนที่ 3 ความคิดเห็นเกี่ยวกับปัจจัยที่มีผลต่อการพิจารณาปรับปรุงคุณภาพและความปลอดภัยของอาหาร

ส่วนที่ 4 การประเมินโครงการฝึกอบรมและลักษณะการฝึกอบรมที่ผู้ประกอบการธุรกิจ SMEs ต้องการ

ขอความกรุณาท่านตอบแบบสอบถามโดยทำเครื่องหมาย ✓ ในช่องหน้าหัวข้อที่ตรงกับตัวท่านมากที่สุด

ส่วนที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

1. เพศ ○ ชาย ○ หญิง
2. อายุ
   ○ ต่ำกว่า 25 ปี ○ 26-35 ปี ○ 36-45 ปี
   ○ 46-55 ปี ○ 56-65 ปี ○ 66 ปีขึ้นไป
3. วุฒิการศึกษา
   ○ ต่ำกว่ามัธยมศึกษาตอนต้น ○ มัธยมศึกษาตอนปลาย/ปวช.
   ○ อนุปริญญา/ปวส. ○ ปริญญาตรี
   ○ ปริญญาโท ○ อื่น ๆ (โปรดระบุ).....
4. ประเภทธุรกิจ และประเภทผลิตภัณฑ์/บริการที่ท่านเป็นเจ้าของ/ ทำงานอยู่
   ○ ผู้ผลิต ประเภทผลิตภัณฑ์ ……..
   ○ กิจการประเภทแบ่งบรรจุเพื่อการขายปลีก ประเภทผลิตภัณฑ์ ……
   ○ กิจการประเภทร้านอาหารและเครื่องดื่ม
   ○ อื่น ๆ (โปรดระบุ)…….
5. ท่านเป็นสมาชิกขององค์กรที่รวมกลุ่มกันเพื่อการพัฒนาผลิตภัณฑ์ หรือ ส่งเสริมอาชีพ เช่น สหกรณ์, ชมรม, กลุ่มแม่บ้าน, กลุ่มผลิตภัณฑ์ชุมชน ฯลฯ หรือไม่
   ○ ไม่เป็น ○ เป็นสมาชิก โปรดระบุกลุ่ม……..
6. ตำแหน่งงานในธุรกิจ
   ○ เจ้าของกิจการ
   ○ พนักงาน
   ○ อื่น ๆ (โปรดระบุ).....

7. จำนวนพนักงานในธุรกิจ (คน)

○ ต่ำกว่า 15 คน ○ 16-25 คน ○ 26-35 คน
○ 36-45 คน ○ 46-55 คน ○ 56 -200 คน

8. รายได้โดยเฉลี่ยของธุรกิจต่อเดือน

○ ต่ำกว่า 10,000 บาท ○ 10,001-20,000 บาท ○ 20,001-30,000 บาท
○ 30,001-40,000 บาท ○ 40,001-50,000 บาท ○ 50,001 บาทขึ้นไป

9. ในรอบ 1 ปีที่ผ่านมา ท่านเคยได้รับข่าวสารเกี่ยวกับความ ปลอดภัยและคุณภาพในอาหารหรือไม่

○ ไม่เคยได้รับข่าวสาร(ข้ามไปทำส่วนที่ 2) ○ เคยได้รับข่าวสาร

10. แหล่งการรับรู้ข้อมูลความรู้,ข่าวสารเกี่ยวกับความ ปลอดภัยและคุณภาพในอาหาร (ตอบได้หลายข้อ)

○ หน่วยงานของรัฐ เช่น กรมส่งเสริมการเกษตร, สำนักงานมาตรฐานสินค้าเกษตรและอาหาร
○ รายการโทรทัศน์ เช่น SMEs ชี้ช่องรวย (โปรดระบุชื่อรายการโทรทัศน์).....
○ รายการวิทยุ เช่น SMEs Today (โปรดระบุชื่อรายการวิทยุ).....
○ หนังสือพิมพ์/วารสาร (โปรดระบุ).....
○ อินเตอร์เน็ต เช่น เวปไซต์ของสำนักงานส่งเสริมวิสาหกิจขนาดกลางและขนาดย่อม
○ ป้ายประชาสัมพันธ์
○ การประชุมสัมมนา
○ อื่น ๆ (โปรดระบุ).....

11. ความถี่โดยเฉลี่ยในการรับข้อมูลความรู้,ข่าวสารเกี่ยวกับความ ปลอดภัยและคุณภาพในอาหาร (ตอบได้ข้อเดียว)

○ น้อยกว่า 1 ครั้ง/เดือน ○ 1-2 ครั้งต่อเดือน ○ 3-4 ครั้งต่อเดือน
○ 3-5 ครั้งต่อสัปดาห์ ○ ทุกวัน

12. ท่านรู้จักระบบบริหารจัดการคุณภาพอะไรบ้าง (ตอบได้หลายข้อ)

○ หลักเกณฑ์และวิธีการที่ดีในการผลิตอาหาร (GMP) ○ ระบบของ ISO
○ ระบบวิเคราะห์อันตรายและจุดวิกฤตที่ต้องควบคุม (HACCP) ○ มาตรฐานอาหารฮาลาล
○ อื่น ๆ (โปรดระบุ).....

ส่วนที่ 2 การวัดระดับความรู้และความเข้าใจเกี่ยวกับคุณภาพและความปลอดภัยของผลิตภัณฑ์อาหาร

คำชี้แจง โปรดพิจารณาข้อความแต่ละข้อ และ ทำเครื่องหมาย / ลงในช่องที่ตรงกับความคิดเห็นของท่าน โดยแต่ละข้อความเลือกตอบได้เพียงช่องเดียวเท่านั้น

ข้อที่	ข้อความที่เกี่ยวข้องกับความรู้และความเข้าใจเกี่ยวกับคุณภาพและความปลอดภัยของผลิตภัณฑ์อาหาร	ความคิดเห็นต่อข้อความ					
		เห็นด้วยอย่างยิ่ง 5	เห็นด้วย 4	เฉย ๆ 3	ไม่เห็นด้วย 2	ไม่เห็นด้วยอย่างยิ่ง 1	ไม่ทราบ 0
1.1	สถานที่ผลิตควรมีการแยกบริเวณสำหรับผลิตอาหารออกเป็นสัดส่วนโดยเฉพาะ						
1.2	การให้สัตว์สามารถเข้ามาได้ในบริเวณที่มีการผลิตอาหารเป็นการเพิ่มความเสี่ยงในอาหารไม่ปลอดภัย						
1.3	การเลือกใช้อุปกรณ์ในการเตรียมอาหารช่น เขียง, มีด, โต๊ะ ควรคำนึงถึงความสะดวกในการใช้งานเป็นหลัก						
1.4	ควรต้องใช้อุปกรณ์ในการเตรียมอาหารเช่น มีด,เขียง กับผักผลไม้ แยกกับอุปกรณ์ในการเตรียมอาหารของเนื้อสัตว์						
1.5	พื้นที่ในการเตรียมอาหารสามารถทำได้บนพื้น ถ้าทำให้เกิดความสะดวกและรวดเร็วในการทำงาน						
1.6	ควรแยกบริเวณพื้นที่ผลิตอาหารเป็นพื้นที่เปียกและพื้นที่แห้ง						
1.7	น้ำที่ใช้ในกระบวนการผลิตอาหาร ต้องเป็นน้ำที่ได้คุณภาพมาตรฐานตามประกาศกระทรวงสาธารณสุขเรื่องน้ำบริโภค						
1.8	เนื้อสัตว์ดิบเฉพาะที่เริ่มส่งกลิ่นเน่าเสียเป็นแหล่งปนเปื้อนที่สามารถทำให้เกิดอาหารเป็นพิษได้						
1.9	เนื้อสัตว์ดิบไม่ควรสัมผัสกับผลิตภัณฑ์เนื้อสัตว์ที่ปรุงเสร็จแล้วพร้อมบริโภคทั้งในขณะจัดเตรียม หรือในกระบวนการผลิต						
1.10	ควรมีการบันทึกแหล่งที่มาของวัตถุดิบและชนิดผลิตภัณฑ์ที่ผลิต เพื่อเป็นข้อมูลในการตรวจสอบในกรณีที่มีข้อร้องเรียนจากลูกค้าเกี่ยวกับการปนเปื้อนของวัตถุดิบ						
1.11	พนักงานที่มีบาดแผลที่นิ้วยังคงทำงานต่อไปได้ ถ้ามีการปกปิดแผลให้มิดชิด						
1.12	การไว้เล็บยาว, การทาสีเล็บ, การสวมเครื่องประดับของ พนักงานที่ทำการผลิตสามารถทำได้ ถ้าไม่ส่งผลต่อความล่าช้าในการทำงาน						
1.13	ควรล้างมือให้สะอาดก่อนการประกอบอาหาร และ เตรียมวัตถุดิบทุกครั้ง						
1.14	ความปลอดภัยของอาหารเกี่ยวข้องกับการปนเปื้อนของจุลินทรีย์เท่านั้น						

ข้อที่	ข้อความที่เกี่ยวข้องกับความรู้และความเข้าใจเกี่ยวกับคุณภาพและความปลอดภัยของผลิตภัณฑ์อาหาร	ความคิดเห็นต่อข้อความ					
		เห็นด้วยอย่างยิ่ง 5	เห็นด้วย 4	เฉย ๆ 3	ไม่เห็นด้วย 2	ไม่เห็นด้วยอย่างยิ่ง 1	ไม่ทราบ 0
1.15	คุณภาพของวัตถุดิบเริ่มต้นไม่มีผลต่อคุณภาพของผลิตภัณฑ์อาหารหลังการแปรรูปมากนัก เนื่องจากวัตถุดิบนั้นต้องผ่านกระบวนการแปรรูปโดยใช้ความร้อน						
1.16	ลักษณะอาหารที่ไม่มีกลิ่นบูด, รสชาติปกติเป็นตัวบ่งชี้ว่าอาหารมีความปลอดภัย						
1.17	เวลา และ อุณหภูมิที่เก็บวัตถุดิบไว้ก่อนการแปรรูปมีผลต่อคุณภาพของผลิตภัณฑ์อาหาร						
1.18	ภาชนะที่ใช้ในการบรรจุอาหารสำเร็จรูปเพื่อการจัดส่งควรแยกกับภาชนะที่ใช้ในการบรรจุของดิบ						
1.19	ถ้าผลิตอาหารตามหลักปฏิบัติที่ดี ไม่จำเป็นต้องคำนึงถึงสภาวะในการขนส่ง						
1.20	การอุ่นอาหารให้ร้อนก่อนการรับประทานจะสามารถทำลายสิ่งที่ปนเปื้อนและอาจก่อให้เกิดอาหารเป็นพิษได้						
1.21	อาหารที่ผ่านการต้มโดยใช้ความร้อนที่อุณหภูมิสูงกว่า 70°C ประมาณ 30 นาที มีความปลอดภัยที่จะบริโภค						
1.22	จุลินทรีย์ทุกชนิดที่พบในผลิตภัณฑ์อาหารเป็นอันตราย						
1.23	ผัก/ผลไม้ที่ผ่านการแปรรูปด้วยความร้อนสูง เช่น ทุเรียนทอด, ลูกหยีกวน, มะม่วงแช่อิ่มอบแห้ง,น้ำผลไม้ไม่จำเป็นต้องทำความสะอาดวัตถุดิบก่อนการแปรรูป						
1.24	ปริมาณการใช้สารกันบูดที่ใช้ ขึ้นกับอายุของผลิตภัณฑ์ที่ต้องการ ตราบใดที่เป็นสารที่อย. อนุญาตให้ใช้						
1.25	อาหารที่มีเครื่องหมาย อย. แล้วมีความปลอดภัยในการบริโภค						
1.26	ไม่จำเป็นต้องมีฉลากแสดงชื่อผู้ผลิตเนื่องจากอาจทำให้เกิดการเลียนแบบผลิตภัณฑ์จากคู่แข่งขัน						
1.27	ระบบการจัดการความปลอดภัยในอาหารเช่น GMP, HACCP เป็นสิ่งจำเป็นสำหรับการผลิตอาหารเชิงอุตสาหกรรม						
1.28	ธุรกิจขนาดกลางและขนาดย่อมที่ผลิตผลิตภัณฑ์จำหน่ายแต่เพียงในประเทศ ไม่มีจุดประสงค์เพื่อการส่งออก ระบบการจัดการคุณภาพและความปลอดภัยในอาหาร (เช่น GMP, HACCP) ยังเป็นสิ่งไม่จำเป็นนัก						

ส่วนที่ 3 ความคิดเห็นเกี่ยวกับปัจจัยที่มีผลต่อการปรับปรุงคุณภาพและความปลอดภัยของอาหาร

คำชี้แจง โปรดแสดงความคิดเห็นต่อปัจจัยที่มีอิทธิพลต่อการจัดทำระบบคุณภาพแต่ละปัจจัย และ ทำเครื่องหมาย / ลงในช่องที่ตรงกับความคิดเห็นของท่าน โดยแต่ละข้อความเลือกตอบได้เพียงคำตอบเดียวเท่านั้น

ข้อที่	ปัจจัยที่มีอิทธิพลต่อการปรับปรุงคุณภาพและความปลอดภัยของผลิตภัณฑ์อาหารของธุรกิจท่าน	ความคิดเห็นต่อข้อความ					
		เห็นด้วยอย่างยิ่ง 5	เห็นด้วย 4	เฉยๆ 3	ไม่เห็นด้วย 2	ไม่เห็นด้วยอย่างยิ่ง 1	ไม่ทราบ 0
1.1	ความไม่พร้อมด้านงบประมาณในการปรับปรุงระบบการจัดการคุณภาพและความปลอดภัยของผลิตภัณฑ์อาหาร						
1.2	ลูกค้าไม่เห็นความสำคัญของผลิตภัณฑ์ที่ผ่านการรับรองระบบคุณภาพ						
1.3	การจัดทำระบบคุณภาพไม่มีผลต่อการเพิ่มยอดขายของผลิตภัณฑ์						
1.4	เพื่อภาพลักษณ์ของธุรกิจ						
1.5	เป็นข้อบังคับทางกฎหมาย						
1.6	เป็นความรับผิดชอบต่อสังคม						
1.7	เป็นวิธีการสร้างความแตกต่างของผลิตภัณฑ์จากคู่แข่ง						

ส่วนที่ 4 ลักษณะการฝึกอบรมที่ผู้ประกอบการธุรกิจ SMEs ต้องการ

1. จากหลักสูตรการฝึกอบรม/ สัมมนาต่อไปนี้ ให้เรียงลำดับหลักสูตรที่ท่านสนใจ โดยให้จัด 3 อับดับแรก ให้ลำดับที่ 1 หมายถึง ท่านสนใจเข้าร่วมการฝึกอบรมมากที่สุด

○ เทคโนโลยีที่ใช้ในกระบวนการผลิต/ การแนะนำเทคโนโลยีใหม่ที่ใช้ในกระบวนการผลิต
○ การบริหารจัดการระบบคุณภาพและความปลอดภัยอาหาร
○ การใช้โปรแกรมคอมพิวเตอร์เพื่อรวมรวบข้อมูลทางธุรกิจ และ ช่วยในการตัดสินใจ
○ การบริหารจัดการทางด้านการเงินของธุรกิจ
○ การทำการตลาดสำหรับผลิตภัณฑ์อาหาร
○ การจัดการโซ่อุปทานของธุรกิจ
○ ข้อบังคับ/ กฎหมายต่าง ๆ ที่เกี่ยวข้องกับผลิตภัณฑ์อาหาร
○ อื่น ๆ (โปรดระบุ)……..

2. ทางมหาวิทยาลัยเกษตรศาสตร์จะมีการจัดทำการสัมภาษณ์เชิงลึกเพื่อจัดหลักสูตรการสร้างความตระหนักเรื่องคุณภาพและความปลอดภัยให้ผู้ประกอบการด้านอาหารขนาด SMEs ท่านสนใจที่จะเข้าร่วมการทำสัมภาษณ์เชิงลึกโดยใช้ระยะเวลาประมาณ 3 ชั่วโมงเพื่อ จะได้รับการพิจารณาเข้าร่วมการอบรมในหลักสูตรดังกล่าวหรือไม่

   ○ สนใจ ○ ไม่สนใจ

3. ท่านต้องการรับข้อมูลการฝึกอบรมของมหาวิทยาลัย

   ○ ต้องการ ○ ไม่ต้องการ

4. เบอร์โทรศัพท์/ อีเมล์/เพื่อรับข่าวประชาสัมพันธ์……..

   สถานที่ติดต่อของท่านเพื่อรับข่าวประชาสัมพันธ์…….

ขอขอบพระคุณที่ให้ความร่วมมือในการตอบแบบสอบถาม

Appendix B

SMEs product pictures based on products commodity and preserving technology at retail stores, during January to June 2010

Appendix Figure B1 Fruits and vegetables products from SMEs

Preserving technology	Products pictures
Thermal processing	
Dehydration/Evaporation	
Fermentation	
Freezing	Not found SMEs' products

Appendix Figure B2 Fish and seafood products from SMEs

Preserving technology	Products pictures
Thermal processing	Not found SMEs' products
Dehydration/Evaporation	
Fermentation	
Freezing	Not found SMEs' products

Appendix Figure B3 Meat and poultry products from SMEs

Preserving technology	Products pictures
Thermal processing	Not found SMEs' Products
Dehydration/Evaporation	
Fermentation	
Freezing	

Appendix Figure B4 Milk and milk products from SMEs

Preserving technology	Products pictures
Thermal processing	
Dehydration/Evaporation	
Fermentation	
Freezing	Not found SMEs' products

Appendix Figure B5 Grain and Bakery products from SMEs

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CURRENT WORKING	-
WORKING EXPERIENCE	Marketing and Sales (Export) during May 2008-2009 at Narai Interfood Co., Ltd.
	Project Manager : 'An Awareness Raising Programme on Current Trends in the Processed Food Market and their Implication for Small and Medium Thai Food Processors. (FAO Project Year 2010)