

ผลสัมฤทธิ์ของการบริหารจัดการความปลอดภัยในอุตสาหกรรมอาหารทะเลแช่เยือกแข็ง Performance of Food Safety Management System in Frozen Seafood Industry

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บทคัดย่อ

การประยุกต์ใช้ระบบการจัดการความปลอดภัยอาหารช่วยเพิ่มขีดความสามารถในการแข่งขันและสร้างความเชื่อมั่นให้กับผู้บริโภคในความปลอดภัยของผลิตภัณฑ์อาหาร ดังนั้นงานวิจัยนี้มีวัตถุประสงค์เพื่อพัฒนาและประยุกต์ใช้ระบบการจัดการความปลอดภัยอาหารตามมาตรฐานระบบ ISO22000 ในผลิตภัณฑ์หมึกแช่เยือกแข็ง และได้มีการประเมินผลสัมฤทธิ์ของการประยุกต์ใช้ระบบดังกล่าว โดยกำหนดตัวชี้วัดที่เกี่ยวข้อง 4 ด้าน คือ ด้านการจัดการพื้นฐานด้านสุขลักษณะ ด้านการจัดการความปลอดภัยอาหาร ด้านประสิทธิภาพการปฏิบัติงานของพนักงาน และด้านประสิทธิภาพของการจัดการ ผลการวิจัยพบว่าตัวชี้วัดด้านการจัดการพื้นฐานด้านสุขลักษณะ ในเรื่อง การควบคุมสัตว์พาหะ สุขลักษณะของผู้ปฏิบัติงานและ ปริมาณคลอรีนที่ใช้ในอ่างล้างมือ/บ่อล้างเท้า เป็นไปตามค่าที่ควบคุม ในด้านการจัดการความปลอดภัยอาหาร พบว่าผลการดำเนินงานด้านคุณภาพของผลิตภัณฑ์หลังจากขั้นตอนการแช่เยือกแข็ง และขั้นตอนการเคาะและบรรจุ เป็นไปตามค่าเป้าหมายที่กำหนดไว้ ส่วนผลการดำเนินงานด้านคุณภาพของวัตถุดิบ คุณภาพผลิตภัณฑ์ระหว่างจัดเก็บคุณภาพผลิตภัณฑ์ก่อนส่งออก การควบคุมอุณหภูมิหลังการแช่เยือกแข็งและ คุณภาพของผลิตภัณฑ์สุดท้าย มีค่าที่สูงขึ้นเนื่องจากมีการฝึกอบรมพนักงานให้เข้าใจวิธีการทำงานที่ถูกต้องมากขึ้น ส่วนด้านประสิทธิภาพการปฏิบัติงานของพนักงานพบว่าหน่วยงานมีความชัดเจนในการปฏิบัติงานมากขึ้น ส่งผลให้พนักงานปฏิบัติงานเป็นไปตามค่าเป้าหมายที่ได้กำหนด ในส่วนของดัชนีชี้วัดด้านประสิทธิภาพของการจัดการ พบว่าสามารถจัดการข้อร้องเรียนได้ทันเวลาตามที่กำหนดและมีคะแนนความพึงพอใจของลูกค้าอยู่ในระดับดี

คำสำคัญ : ระบบISO 22000 การบริหารจัดการความปลอดภัยอาหาร ผลสัมฤทธิ์ของ ISO 22000

Abstract

Application of food safety management system in frozen seafood industry was studied. The objectives of this research were to develop and implement ISO 22000 system in frozen squid production. All required documents such as GMP procedures, HACCP manual, ISO 22000 procedures were developed and fully implemented. To evaluate the food safety management system (FSMS), various indicators were designed to record the relevant performances consisting of 3 indicators for prerequisite program, 7 indicators for food safety management system, 3 indicators for operating performance and 2 indicators for management efficiency . The result showed that all 3 indicators for prerequisite program i.e. pest control, personal hygiene and chlorine level in hand washing sink / foot washing pond were conformed to the control level both before and after ISO 22000 system implementation. The indicators for food safety management system i.e. the quality of receiving raw material, damaged product during cold storage, quality of finished product before loading, number of defected product block during freezing, number of defected product block during packing, temperature of product before

freezing, nonconformity of finished product before loading showed that after ISO22000 system implementation they were non-conformed to the target value except the number of defected product block during freezing and packing. The operating performance (OP) consist of 3 indicators i.e. the correction of sizing, the quality of finished product before loading and number of nonconforming labels. Indicators that all indicators were non-conformed to the target value except number of nonconforming labels after implementation. The management efficiency (ME) consist of 2 indicators i.e. time to manage the customer complaint and score of external customer satisfaction which found that the company could manage to response the customer complaint within the specified time. The survey on external customer's satisfaction showed that the scores before implementation were in the average of 80%.

Keywords: ISO 22000 system, Food Safety Management, ISO 22000 performance

1. Introduction

Frozen seafood industry has enjoyed a robust growth over the past couple of years. The mainstays of Thai frozen seafood products are shrimp, fish and squid. Over 90% of frozen seafood is exported. Thai frozen seafood industry has confronted with various problems on the export such as trade barriers, economic problems in the importing countries and intense competition from the low-cost rival countries. These circumstances have widened the opportunity for Thai industry. To cope with this situation, various activities, particularly food safety management should be done to improve the production efficiency, cost competitiveness and market satisfaction. (Department of Business Economics, 2001). Earlier approaches to ensuring food safety were based only on end product testing, which is no longer adequate to ensure food safety. This is now being replaced by a food safety management system approach that focuses on food hazard prevention throughout the food chain. Food safety hazards may be introduced and appear at any stage of food chain "from farm to fork". The elimination of the 'weak links' in the food chain is the objective of the new international standard ISO 22000:2005 "Food safety management system – Requirements for any organization in the food chain"(Tsola, 2008). At present, ISO 22000 system is considerably relevant to the food industry as it combined three system of GMP, HACCP and ISO 9000. Application to food safety management system following ISO22000 in Thailand is still not widely used and the industry seldomly evaluated the performance. Therefore, food industry should consider the relevant indicators for the effectiveness of food safety management system.

The application of GMP and HACCP to traditional food processing showed that the hazards associated with the traditional practices could be effectively managed or controlled (Amoa-Awua *et al.*, 2007). It was also reported that HACCP could be implemented at minimal cost into such traditional operations relying on very simple techniques and instruments such as visual inspections and timing of unit operations. Implementation of HACCP system concepts into food production line showed the improved microbiological safety of potato omelette and pork loin at the university restaurant in Spain (Soriano *et al.*, 2002). The lower incidence of studied microorganisms was mainly the results from good manufacturing practices (GMP) including cleaning, sanitation and personal hygiene as well as the rearrangement of some establishments. Implementation of HACCP system at large- and medium-sized food enterprises in China were studied (Bai *et al.*, 2007). The result indicated that HACCP system were successfully implemented in food enterprises to reduce the number to holded product in international market.

The objectives of this study were to develop and implement ISO 22000 system in frozen seafood industry and then estimate the performance of ISO 22000 system implemented in a selected processing plant.

2. Methodology

1. Survey and gathering information on the production of frozen squid from the selected plant before implementation of ISO22000 system. Flow diagram, relevant standard procedures and prerequisite programs (PRPs) of frozen seafood industry were evaluated.

2. Development of ISO 22000 system (ISO, 2005).

The organization planned for documents preparing, format and a number of documents concerning to the standard of ISO 22000 system. Food safety team were assigned to response for writing and improving all documents.

3. Application of ISO 22000 system to the processing plant.

The developed ISO 22000 system was applied to the selected plant by training all relevant operators to understand standard procedure and concern to their responsibilities on the ISO 22000 system.

4. Design the KPI to represent the performance for ISO 22000 system.

The key performance indicators (KPI) were designed concerning to the requirement of ISO 22000 system. Then the target value for each indicators were discussed and approved by representatives of the plant.

5. Collection data on the performance indicators

The data were collected on the performance indicators of the plant six monthly before and after ISO 22000 system implementation on the production of frozen squid.

3. Results and Discussion

1. The information on the production of frozen squid before implementation ISO22000 system.

Prerequisite programs (PRPs) of the selected plant were evaluated by the staff of Department of Fisheries, Thailand. According to the standard of DOF, the selected plant was scored on level B with one serious problem. There was not yet evaluated after ISO22000 implementation. The verified process flow diagram for the production of frozen squid product was shown in Fig.1.

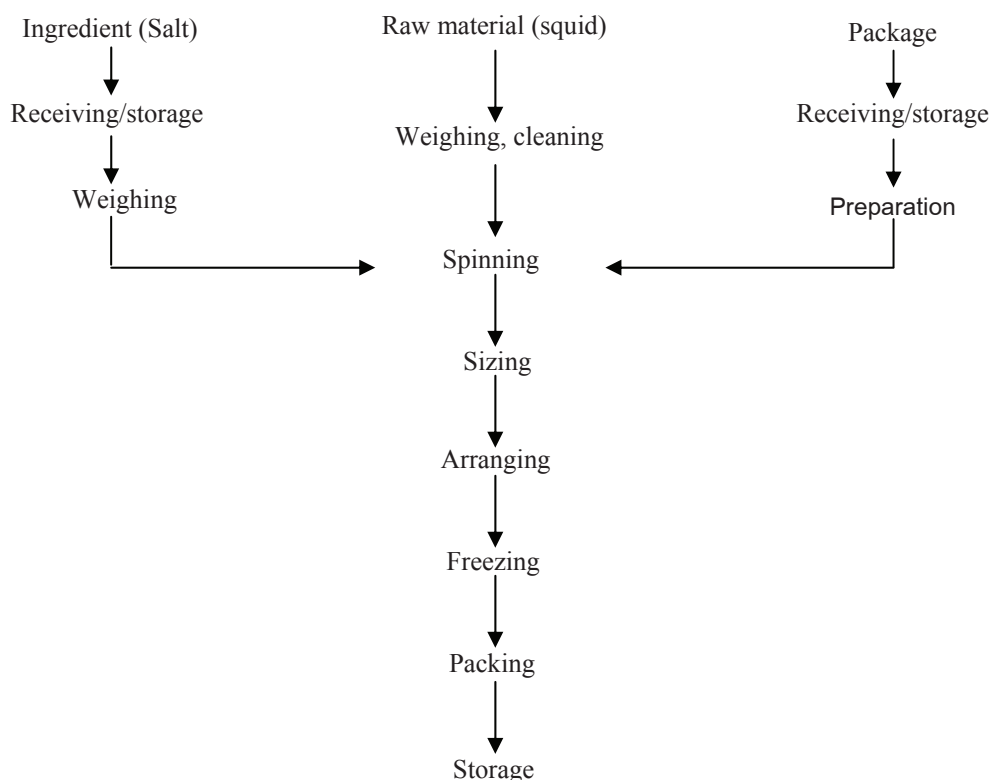


Figure 1. Flow diagram of the frozen squid production

2. Document for ISO 22000 system in frozen squid production.

All required documents conforming to the requirement of ISO 22000:2005 system were developed including 7 PRP procedures, 1 HACCP manual, 1 food safety management system manual, 26 ISO22000:2005 procedure.

3. Application of ISO 22000 system in frozen squid production

Then, the developed system was applied into the real operation of the plant by conducting the meeting, group training and on the job training to all relevant personals. All operators were trained 4 times which cover prerequisite program, Hazard Analysis and Critical Control Point, food safety management system and internal quality audit.

4. The KPI to represent the performance of ISO 22000 system.

The key performance indicators were established to measure the performance of food safety management system, 15 indicators in 4 aspects i.e. prerequisite program, food safety management, operating and management as shown in Table 1. The target value for all indicators were considered and approved by the representatives of the selected plant.

Table 1. Key performance indicator for food safety management system of the selected plant

Indicator	Target value
For prerequisite program	
1. effectiveness of pest control	more than 90 % of recorded pest situation pass the control value
2. effectiveness of personal hygiene	more than 80 % of all personal hygiene pass the hygienic standard
3. chlorine level in hand washing sink / foot washing pond	more than 90 % of recorded chlorine pass the control level
For food safety management	
1. quality of receiving raw material	more than 97 % of total raw material
2. damaged product during cold storage	less than 1 % of total product
3. quality of finished product before loading	100% of all finished product conformed to the product standard
4. defected product block during freezing	less than 5 % of total product
5. defected product block during in packing	less than 5 % of total product
6. temperature of product after freezing	more than 99% of recorded temperature of product after freezing pass the control value
7. nonconforming of finished product before loading	less than 1 % of all finished product before loading
For operating performance	
1. correction of sizing	100 % of total correction of sizing conformed to sizing standard
2. loading time	more than 95% of total number loading

Table 2. Average score for prerequisite program, food safety management, operating performance and management effectiveness

Indicator	Average score (%)		
	Before (%)	Target (%)	After (%)
Prerequisite program			
1. effectiveness of pest control	97.67	90	100
2. effectiveness of personal hygiene	96.77	80	96.48
3. chlorine level in hand/foot washing sink/pond	99.91	95	100
Food safety management			
1. quality of receiving raw material	97.17	97	96.55
2. damaged product during cold storage	100	99	93.85
3. quality of finished product before loading	99.22	100	93.85
4. defected product block during freezing	98.14	95	98.27
5. defected product block during packing	97.90	95	98.32
6. temperature of product after freezing	94.32	99	96.89
7. nonconforming of finished product before loading	98.84	99	97.71
Operating performance			
1. correction of sizing	85.18	100	88.27
2. loading time	74.52	95	83.33
3. conforming label	99.96	95	100
Management effectiveness			
1. time to manage the customer complaint	100	100	100
2. score of external customer satisfaction	80	90	-

4. Conclusions

ISO 22000 system was successfully applied into the production of the frozen squid product at Southern Marine Products Co. Ltd. The performance indicators in this study including the prerequisite program, the food safety management, operating performance as well as management effectiveness were systematically collected and maintained for future use. The conformity of the established indicators was slightly changed after the system application. The effectiveness of food safety management system indicated that the selected plant should consider a new and more challenge target for continuous improvement.

5. References

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