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Stanisław Popek

Cracow University of Economics, Faculty of Commodity Sciences, Department of Foodstuffs Commodity Science
popeks@uek.krakow.pl

THE IMPLEMENTATION OF THE REQUIREMENTS OF THE ISO 22000 STANDARD ON THE BASIS OF AN INTEGRATED MANAGEMENT SYSTEM OF FOOD INDUSTRY ORGANIZATION – A MODEL SOLUTION

Abstract: For food industry companies, a critical issue in the present market-driven situation (globalization, competitiveness, high supply) is high quality goods production, especially health-quality ones. Considering the more frequent use of additional quality systems, based on ISO standards, by food industry companies, the analysis of possibilities of introducing the Food Safety Assurance System (based on the ISO 22000:2005 standard) on the basis of the existing and functioning Quality Management System has been conducted in the present work. The data was acquired from 10 food industry companies in which the integrated ISO9001 system is functioning and the HACCP by doing direct (face-to-face) interviews, with companies` quality proxies being the subject of the research. Proxies were people who had performed their functions for at least 5 years. The questions concerned issues related to the functioning Integrated Quality Management System in the context of the requirements of the Food Safety Management System based on the ISO 22000:2005 standard. The data was obtained from the meat industry companies that achieved the highest income in 2012–2014. The assessment and results of the present work can help food industry companies` management in making a decision about eventually adjusting the functioning, obligatory systems to the normative requirements of the ISO 22000 and subjecting it to the certification process in order to achieve confirmation of implementation of this system.

Keywords: food, safety, quality, HACCP, ISO 22000.

JEL classification: L15.

WDRAŻANIE WYMAGAŃ NORMY ISO 22000 NA BAZIE ZINTEGROWANEGO SYSTEMU ZARZĄDZANIA ORGANIZACJĄ W BRANŻY SPOŻYWCZEJ – MODELOWE ROZWIĄZANIE

Streszczenie: Dla przedsiębiorstw przemysłu spożywczego w obecnej sytuacji rynkowej (globalizacji, konkurencyjności, wysokiej podaży) kluczową kwestią jest produkcja wysokiej jakości towarów, zwłaszcza dotyczących jakości zdrowotnej. Ze względu na coraz częstsze stosowanie przez przedsiębiorstwa branży spożywczej dodatkowych systemów jakości, opartych na normach ISO, w niniejszym rozdziale przeprowadzono analizę możliwości wdrożenia systemu zapewnienia bezpieczeństwa żywności (zgodnie z normą ISO 22000:2005) na bazie istniejącego i funkcjonującego systemu zarządzania jakością. Dane pozyskano z 10 firm branży spożywczej, w których funkcjonuje zintegrowany system ISO 9001 i HACCP, w drodze wywiadu bezpośredniego z pełnomocnikami ds. jakości przedsiębiorstw będących przedmiotem badań. Pełnomocnicy pełnili swoje funkcje przez co najmniej pięć lat. Pytania dotyczyły zagadnień związanych z funkcjonującym zintegrowanym system zarządzania jakością w kontekście wymagań systemu zarządzania bezpieczeństwem żywności zgodnie z normą ISO 22000:2005. Dane pozyskano z przedsiębiorstw branży mięsnej, osiągających najwyższe dochody w latach 2012–2014. Przeprowadzona ocena i wyniki niniejszej pracy mogą być pomocne kierownictwom firm branży spożywczej w podjęciu decyzji o ewentualnym dostosowaniu funkcjonujących, obligatoryjnych systemów do wymagań normatywnych ISO 22000 i poddaniu procesowi certyfikacji celem uzyskania potwierdzenia wdrożenia tego systemu.

Słowa kluczowe: żywność, bezpieczeństwo, jakość, HACCP, ISO 22000.

Introduction

Considering the growing requirements of customers and other parties, food industry companies must take actions in order to improve food safety and quality [FAO/WHO. Food 2006; FAO/WHO. Recommended 2003].

Guarantees to achieve the highest possible health quality of food and its full safety and at the same time meet expected consumers` needs, safety and food quality management systems [Wrześniewska-Wal 2009; Wysokińska-Senkus 2008; 2009; Mokrosińska 2006] are more frequently used in food industry companies.

Aside from the basic health safety of food, the HACCP system required by the food law regulations, there is a wide range of non-obligatory health safety and food quality management systems, which include: the Quality Assur-

ance Control Point System (QACP), systems based on ISO standards series 9000 and ISO 22000 [Mokrosińska 2006]. The HACCP system based on the ISO 22000 standard has been analyzed in detail for the needs of the present work.

The basic tool, which guarantees constant monitoring of the health safety of food in food industry companies is the Hazard Analysis and Critical Control Points system (HACCP), which, according to the Regulations of the European Parliament and of the Council Article 5 (WE) nr 852/2004 is obligatory for every company in the food sector. ("All enterprises of the food sector regardless of the size and profile of conducting economic activity, shall put in place, implement and maintain a permanent procedure or procedures based on the HACCP system principles."). The aim of the HACCP system is to provide food health security by identifying and assessing the scale of food safety hazards from the point of view of heath quality and the threat that these hazards may appear in all stages of food production and distribution [Turlejska 2003; Sperber 2005]. Its aim is also to define methods that limit the risks and establish corrective measures. The base of the HACCP system is the so-called critical control points, established as a result of in-depth analysis of the hazards that may cause health quality reduction of produced food. The HACCP system works on the basis of 7 basic principles (Table); correct proceedings and implementation of procedures based on the HACCP guarantees high quality of healthy food production.

Seven principles of HACCP

Principle 1 – Hazards analysis; identification and assessment of hazards and the risk of their appearance and establishment of control measures and methods of preventing these threats
Principle 2 – Establishment of Critical Control Points – CCP in order to eliminate or minimize the hazards
Principle 3 – Establishment of requirements (parameters), which should be fulfilled for each critical control point and establishment of tolerance borders (critical limits)
Principle 4 – Establishment and implementation of critical control points monitoring system
Principle 5 – Establishment of corrective measures if the critical control point does not satisfy the given requirements
Principle 6 – Establishment of verification procedures in order to confirm that the system is effective and in accordance with the plan
Principle 7 – Elaboration and record keeping of HACCP concerning the stages of its implementation and establishment of the way of registering and storing the data and retaining the system documents for an appropriate period

Source: [Turlejska and Pelzner 2003].

HACCP, being an obligatory health safety management system of food, is inseparably connected to the realization of Good Hygienic Practice principles (GHP) and Good Manufacturing Practice (GMP) [Kołożyn-Krajewska 2012; Dzwolak 2008; Kołożyn-Krajewska and Dolatowski 2007]. Both systems (GMP and GHP) concern the basic areas of activity in the range of hygiene as well as production providing proper health quality of food and safety for a consumer. GMP`s basic task is providing health safety of food by conscientious control and keeping records of each stage of the food chain process (reception and storage of recyclable and ready materials, pretreatment and main treatment, internal and external transport, distribution). GHP concerns, however, the hygienic aspects of production, or planning the production in accordance with the hygienic principles. The range of GHP control includes localization and surroundings of the enterprise, as well as infrastructure with machines and devices, which have direct or indirect contact with food, processes of washing ad disinfection, control of waste and personnel`s hygiene and health.

The ISO 22000:2005 standard (Polish version PN-EN ISO 22000:2006) is a document containing guidelines concerning implementing, functioning and improving the system of health safety management of food for enterprises in a food chain [Berdowski and Zagroba 2010; Surak 2007; Beulens *et al*. 2005; Prati *et al*. 2004]. It connects the requirements of the HACCP system with the principles of the GMP and GHP. However, it is more structurally expanded, giving a chance of integration with the quality management system ISO 9001:2009 (PN-EN ISO 9001:20090 and with the environmental management system ISO 14001:2005 (PN-EN ISO 14001:2005) [Luning *et al*. 2003]. The main establishment of the ISO 22000 standard is health safety assurance of food in the whole food. In connection with this, while building the food safety system, a company is obliged to identify, assess, and control internal hazards, and inform cooperating subjects within the food chain about matters that can have indirect or direct influence on the manufactured product`s safety. The ISO 22000 standard, therefore, encompasses all units that take part in the food production process, from agriculture to the companies providing catering services, including packaging businesses [Cormier *et al*. 2007; Urbaniak 2007].

One of the biggest advantages of the ISO 22000 standard, distinguishing it from other similar BRC or IFS systems, is the lack of a detailed list of requirements. According to the establishments of the international ISO 22000 standard, an enterprise with an implemented system of food safety management must prove the ability to control hazards to food safety

in order to assure everyone that the food is safe during consumption by people and that it will not cause any health damage [Turlejska and Pelzner 2003; Turlejska 2003].

The system based on the ISO 22000 standard is principally analogical to the quality management system consistent with the ISO standard series 9001:2009. However, in spite of major consistency, it is advised to integrate both norms because the ISO 22000:2005 norm does not include certain, crucial for the functioning of the company, requirements resulting from the ISO 9001:2009 standard in the range [Wysokińska-Senkus 2008; Berdowski 2007; Dzwolak 2007]:

- a process approach to management;
- announcing the customer`s requirements (the ISO 22000:2005 standard concentrates mainly on retaining health food safety);
- regulations concerning a process and processes of the contacts with a client;
- a product design;
- production management (production planning, material service entrusted by a client).

The ISO 22000:2005 standard defines food safety as "a concept depending on the fact that food will not do any harm to the consumer if it is prepared or/and consumed in accordance with its use" [Mokrosińska 2006; Jackiewicz 2004].

Considering the more frequent use of additional quality systems, based on ISO standards, by food industry companies, an analysis of possibilities of introducing the Food Safety Assurance System (based on the ISO 22000:2005 standard) on the basis of the existing and functioning Quality Management System, has been conducted in the present work [Marvin *et al.* 2009].

1. Experimental

The data was acquired from 10 food industry companies in which the integrated ISO9001 system is functioning and the HACCP by doing direct (face-to-face) interviews with companies` quality proxies being the subject of the research. Proxies were people who had been performing their functions for at least 5 years. The questions concerned issues related to the functioning Integrated Quality Management System in the context of the requirements of the Food Safety Management System based on

ISO 22000: 2005 standard. The data was obtained from the meat industry companies that achieved the highest income in 2012–2014.

2. Results and Discussion

2.1. The analysis of possibilities of the ISO 22000:2005 standard implementation on the basis of the existing Quality Management System

The data, which serves to do the analysis, come from the food industry company. Below presents the juxtaposition of the ISO 22000:2005 standard requirements with the implemented, or being implemented elements of the ISO 9001 and the HACCP system (being part of Integrated Quality Management System) functioning in the analyzed enterprise.

In relation to the specification of ISO 22000:2005 General Requirements, it was found that the Integrated Quality Management System, which functions in a company, has been elaborated in accordance with the BRC standard requirements; however, the documentation has been prepared based on a model described in the ISO 9001 standard. This system has been established, documented and implemented; moreover, it is maintained and constantly improved in order to realize the accepted Quality Policy, achieving aims, which concern the quality, improvement of the offered services quality and meeting the clients' expectations.

Implementation Requirements Concerning Documentation in the studied companies were as follows:

IQMS documentation includes:

- Quality Book,
- HACCP plan,
- Quality Policy,
- Defined and documented processes.

The entire documentation process is monitored. The appropriate procedures have been elaborated upon. Their aim is to define the supervision needed to identify, store, search, protect and retain the records, as well as to approve, review, update and appropriate identification of the remaining documentation. The procedures and instructions are available in electronic and paper versions. The Quality Management System defines documents supervision in order to guarantee their actualization on each work positions. It concerns internal documents and information about regula-

tions and legal texts. External documentation is the one that the company is not the author of and does not monitor modifications to, which mainly come from institutions and public administration, local offices, other manufacturers or the competition. Invalid documents, which are stored because of any number of reasons, are identified by the "invalid" seal on the document, file or container, in which they are stored. The processes' owners are responsible for documentation in the areas of operation or to designate people who supervise it. They approve of the content of the documents and ensure their accessibility. The people responsible for distribution and verification of conformity of the documents are shown every day the internal database of the company. Records are kept in order to prove conformity with the requirements and assurance that the QMS is operational, and above all effective. Documents and data being records are monitored and stored by every organizational area of a given process. The monitoring rules of the records are stated precisely by an appropriate procedure, which defines a way for each type of records: a way of identification, rules of storing, segregating, safety, a period of storage defined in accordance with the regulations in force, the QMS restrictions and regulations of destroying the documents after the period of storage.

Taking into consideration Responsibility of the Management, IQMS involves: A Declared Quality Policy supported by actions defined in the Quality Book as a confirmation of management involvement in development and implementation of QMS.

Quality Policy (is broadly available for employees and clients).

The most important, management, ensures that the QMS is being planned in order to fulfill the accepted requirements and achievement of the quality aims. Moreover, the system's integrity is maintained during planning, as well as while implementing any changes. Responsibility, authorization and their mutual connections have been defined in the whole organization in the organizational scheme, power of attorney given by the management of the company, ranges of duties and procedure documents.

The representative of the management – the company's management board – choose a Quality Management proxy, whose task is the implementation, maintenance and improvement of the QMS.

Internal communication. The system of passing information in the range of the QMS works for the whole company. Communication has different forms: written, oral, via telephone, email, and an internal computer system, thanks to which information is quickly passed to all interested parties.

External communication involves: clients, contractors, suppliers, consumers, different types of institutions, organizations and legislative bodies.

Analysis of this point of standards leads to the conclusion of a lack of appropriate.

2.2. Return procedure

Preventive activities. The schedule of preventive activities is arranged, registered and monitored by a person who defines the reasons for a potential inconsistency. The list of preventive activities is placed in the internal base of the company. Verification of their efficiency consists in checking if the realized activities efficiently eliminated the cause of a potential inconsistency within due time.

The QMS is subjected to the reviews of the company's management board and the Quality Management proxy, according to the current company needs. The objective of the review is to provide efficiency and topicality of the implemented QMS and to assign possible areas to improve, including checking the efficiency of the system with reference to the current Quality Policy.

In order to do the review, the data included in the following is necessary:

- written information from the processes` owners about: arrangements realization from the previous review, internal audits plan realization, number and efficiency of corrective and preventive actions, level and reasons of customers` complaints, level, quality of the deliveries and the price of the suppliers;
- report from the previous review;
- correspondence from clients;
- reports from audits;
- inconsistency protocols, conclusions about corrective or preventive actions;
- elaborations concerning economic results, including quality costs;
- descriptions of initiatives reported by employees.

The effects of the review are created by the Quality Policy proxy: a report, defined plans and aims concerning quality and decisions, activities connected to the improvement of QMS efficiency and its processes, the product improvement in connection to the requirements of the clients and the needed resources.

As regards Resources Management, in the context of IQMS resources necessary to maintain QMS and the constant improvement of its effective-

ness, the increase of the client`s satisfaction and fulfillment of certain requirements are defined during cyclical meetings of the management board.

The management board's intention is that the entirety of the personnel who do work influencing the product quality will be aware, competent, appropriately educated, trained, and have the necessary abilities and experience. Management is actively engaged in increasing personnel qualifications by defining required competences, their verification and provision of the means required train the staff.

The necessary infrastructure to achieve compatibility of the offered product with the requirements of the clients is defined, delivered and maintained according to the process documentation and includes, among others, machines and production devices management, eliminating malfunctioning and calibration of the control and measurement instruments.

The work environment necessary to achieve compatibility of the product with the requirements is defined and maintained according to legal regulations in force of Health and Safety at Work, Fire Protection and environment protection. Specialists who cooperate with the organization and have appropriate authorization are responsible for defining and controlling the required environment.

The workplace code of Good Manufacturing Practice includes acceptance of the raw material, storage and dealing with the material, internal transport, storing readymade products, external transport and products distribution. Moreover, records of hard glass, plastic and sticking bandage control are kept. Input data from planning are gathered, maintained, documented and systematically updated. The team to implement the HACCP system has been created; the food safety team has not yet been created.

Considering the specificity of the company`s activity and the diversity of the offered products, shopping policy is based on the choice of trustworthy suppliers from the technological and qualitative point of view. The priority is the products assessment of all suppliers, paying particular attention to the technology and presented level of quality used. Updated documents are kept of all raw materials, packaging, and additional materials that have contact with a readymade product and the product itself.

The intended use and the way how to proceed with produced by a company readymade product, has been described in the specifications. Because of the fact that potential consumers of the manufactured products are children, a scheme of proceedings in case of inappropriate proceedings and incorrect use of the readymade product has been created.

Schemes of processes have been elaborated but not verified by the food safety team.

The hazards analysis has been done on the basis of food law, available literature and the researcher's own experience. The HACCP plans include hazards analysis for the manufactured products for certain production lines. A decision tree was used during the hazards analysis to identify CCP.

Good Hygiene Practice (GHP) includes: buildings and surroundings of the company, machines and tools, washing and disinfection processes, waste and sewage disposal, pests' presence control, water quality control, personnel`s hygiene and training.

The HACCP system complies with the requirements of the ISO 22000:2005 standard. Critical values for the CCP have been identified and assigned, actions in case of exceeding them have been established and monitoring system has been introduced. This point is connected to the paragraph "Documents supervision".

Verification of design and development is done according to the established arrangements (design and development stages, their review, verification, validation, responsibilities and authorization have been assigned). The history of the product production course can be recreated on the basis of the qualitative and identification records documented in the documentation. The number and form of the records required for a given product results from the procedures, which describe the maneuvering in a given process.

The inconsistent product supervision is done in order to remove inconsistencies connected to the product in the production process and product realization. The subject of corrective activities are real or potential inconsistencies reported as a result of: internal or external audit, system review by the management, considering customers` complaints, the analysis of negative events stated during control or signaled by the employees, the analysis of information created during the processes research and as part of new undertakings, as well as the realization of complicated orders. The character of the undertaken actions depends on the scale of influence of the real or potential inconsistency.

In the context of the requirements of ISO 22000; 2005 concerning Validation, Verification and Improvement of the Food Safety Management System, it can be concluded that design and development validations are done according to the strictly arranged plan, so it can be finished by a potential delivery or implementation of a product. Information crucial from the point of view of efficiency and assessment of possibilities of the QMS constant improvement was collected and analyzed.

Appropriate monitoring procedures of checking, calibration of control-measurement devices (for example thermo-, hygrometer or pH-meters) have been elaborated.

Internal audits define if the Quality Management System is consistent with establishments and requirements and if it is efficiently introduced and maintained. Responsibility for preparation, execution and verification of the results is done by the Quality Management proxy, leading auditor and qualified personnel. Internal QMS verification is done by the Quality management proxy in a given area at least once a month, according to the standard elaborated by the company.

According to the management's intentions, constant improvements concern management processes and the quality of the offered products. Supervision and improvement of the quality system includes activities ensuring QMS consistence with the Quality Policy, such as analysis, assessment of the present situation in order to identify the areas to improve, establishment of the operational aims concerning improvement, introduction of the chosen and considered solutions and the review of the results to define further possibilities of improvement through system verification.

Conclusions

It can be seen from the comparative analysis done in the present work that most of the ISO 22000 standard points, analogical to the ISO 9001, are partly or completely realized. Some require correction, but in the case of others, appropriate procedures need to be elaborated and prepared.

The point mentioning readiness and reaction to hazardous situations, which also mentions establishment, implementation, and maintenance of the procedures to manage potential hazardous situations and accidents that can influence food safety and have meaning in connection to the role of organization in the food chain is not realized. This paragraph becomes neuralgic in preparation to the ISO 22000 implementation, especially in the present time of world crisis. What comes after that is increasing hazard of international markets competition.

The lack of a food safety team, which should have appropriate knowledge and experience in the area of elaboration and implementation of the ISO 22000 standard, is the second most important point, which the company does not fulfill and which is necessary to implement this norm.

Nevertheless, in spite of some deficiencies (human resources or sufficient means), including procedures, it can be stated with certainty that the company has solid grounds to implement and maintain the ISO 22000 standard. From the point of view of the management, it is worthwhile to consider benefits from implementing the ISO 22000 standard, because when looking at the present situation of the food industry company in the times of crisis and increasing competition, its implementation can be a strong bargaining counter in making arrangements and contacts. Therefore, in order not to go out of business, different ways of finding new customers and keeping the present ones should be looked for. This is why the analyzed company has made certain steps to implement them.

The assessment and the results of the present work can be helpful for the food industry companies` management in making a decision about eventually adjusting the functioning, obligatory systems to the normative requirements of the ISO 22000 and subjecting it to the certification process in order to achieve confirmation of the implementation of this system.

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