



Safety and Quality Assurance and Management Systems in Food Industry: An Overview

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■ 6.1 INTRODUCTION

Development of the profit-oriented food enterprises, growing consumers' expectations and concerns as regards food quality and safety, as well as increasing requirements of food chain actors, forced many companies to improve safety and quality of their products through implementation of the quality and safety assurance and management systems. This chapter attempts to discuss the problem outlined here by providing a general overview of these systems.

Section *Food Quality and Safety* will first summarize basic terminology related to food quality and safety, and then review the existing safety and quality assurance and management systems, focusing on the relationship between them. It will be followed by the discussion on how to make these systems work, by introducing the aspects of food legislation, official inspections and ethics.

Obtaining a general idea about the above mentioned systems is essential in understanding of how quality and safety of the products are being achieved at

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the food market. Thus, the present chapter endeavours to convey this knowledge to a reader in a simple, concise manner, allowing to quick understanding of the systems without prior familiarity with the subject. In the next chapter, it will be discussed within the frame of food companies in Poland.

6.2 FOOD QUALITY AND SAFETY

Figure 6.1 has been included to organize the basic terms on food quality and safety, by briefly defining such traits as food quality and food health quality, food safety, sensory values and convenience of food products. Food quality can be defined as a total of traits and criteria which characterize food as regards its nutritional value, sensory value, convenience as well as safety for a consumer’s health. Thus, it is a broader concept than food safety. Food safety (hazard-free) is the most important feature of food quality, hence the food law regulates this issue, in order to assure consumers that the food they purchase meet their expectations as regards safety. It is also an increasingly important public health issue. Governments all over the world are intensifying efforts to improve food safety in response to an increasing number of problems and growing consumer concerns as regards various food risks.

Besides, it is important to distinguish between the terms food quality and food health quality. As Figure 6.1 demonstrates, these two remain in the relationship such as food health quality embracing only the health-related traits (that is, hazard-free and nutritional value), whilst food quality being a broader concept, covering all the features presented. Thus, in addition to food health quality related attributes, food quality comprises values such as sensory characteristics (e.g. taste of food, smell, etc.) and convenience (e.g. easy in preparation, etc.).

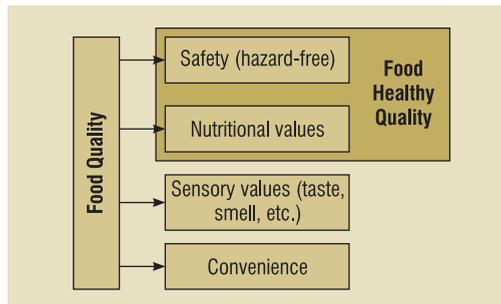


Figure 6.1 Diagram of the relationship between food quality, food health quality and food safety traits (Sikora, T. & Strada, A.)

In order to preserve the above quality features in food products, various safety and quality assurance systems have been developed. Any system constitutes a systematic approach to assure that food products have particular traits at any stage of production and distribution. Some of the systems are obligatory by law and some voluntary to be implemented by the food chain members (Figure 6.2).

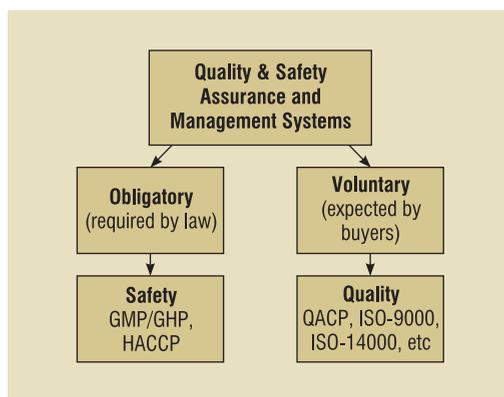


Figure 6.2 Diagram of voluntary vs. obligatory quality and safety systems (Sikora, T. & Strada, A.)

6.2.1 Safety Assurance Systems

The distinction between obligatory and voluntary systems is based on the safety (hazard-free products) being the quality of food required by law. Thus, obligatory systems have been established to assure food safety, and are subsequently called “safety assurance systems”. These include Good Hygiene Practices (GHP), Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Point (HACCP).

Good Manufacturing Practices (GMP) is a set of guidelines specifying activities to be undertaken and conditions to be fulfilled in food manufacturing processes in order to assure that the food produced meets the standards of food safety. Similarly, Good Hygienic Practices (GHP) constitute a set of guidelines specifying activities to be undertaken and hygienic conditions to be fulfilled and monitored at all steps of the food chain in order to assure food safety. Both GMP and GHP constitute a precondition in a food enterprise for implementing the HACCP system. Figure 6.3 illustrates the relationship

between these three food safety assurance systems, where HACCP is a broader category which incorporates its prerequisites GMP and GHP.

Hazard Analysis and Critical Control Point (HACCP) is currently defined by the Hygiene Rules 93/43/EEC in the production line of food in Europe. It comprises the main ideas from the worldwide accepted HACCP-System of the FAO/WHO Codex Alimentarius. It is a systematic food safety assurance method to identify, evaluate and control of food hazards. The HACCP system consists of 12 stages of implementation (Table 6.1), of which five are preliminary tasks and seven are HACCP principles (Codex Alimentarius, 2001).

Table 6.1 HACCP 12 Stages of Implementation

5 preliminary tasks of HACCP:
Task 1: Assemble the HACCP team;
Task 2: Describe the food and its distribution;
Task 3: Describe the intended use and consumers of the food;
Task 4: Develop a flow diagram which describes the process;
Task 5: Verify the flow diagram.
7 principles of HACCP:
Principle 1: Conduct a hazard analysis;
Principle 2: Determine the critical control points (CCPs);
Principle 3: Establish critical limits;
Principle 4: Establish monitoring procedures;
Principle 5: Establish corrective actions;
Principle 6: Establish verification procedures;
Principle 7: Establish record-keeping and documentation procedures.

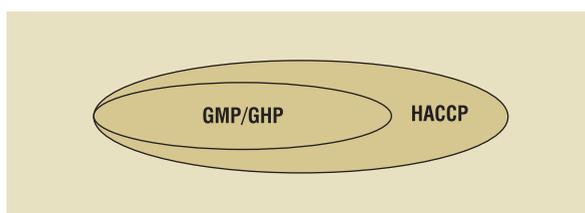


Figure 6.3 Diagram of the relationship between GMP, GHP and HACCP (Kołożyn-Krajewska, D. & Sikora, T. 2001)

6.2.2 Quality Assurance and Management Systems

Maintenance and/or introduction of the remaining qualities in food (nutritional, sensory and convenience values), is not requested by law, albeit desirable by customers. Voluntarily implemented systems, known as quality assurance and management systems, include for example Quality Assurance Control Points (QACP), the well-known ISO-9000 (quality management) and ISO-14000 (environmental management).

Quality Assurance Control Points (QACP) is one of the quality assurance systems in food production, created based on the HACCP concept. In case of HACCP, Critical Control Points (eliminating hazards), parameters and their critical limits are determined³, while in QACP – Control Points (quality assurance, not safety), parameters and their critical values⁴. Likewise in HACCP, QACP is unique for each company and must be introduced individually for each enterprise and production line.

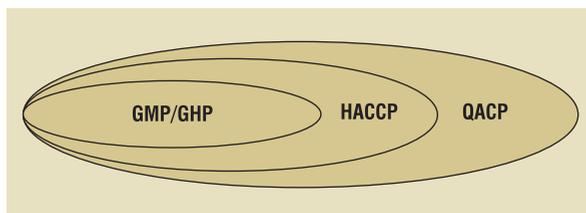


Figure 6.4 Diagram of the relationship between GMP, GHP, HACCP and QACP (Kołozyn-Krajewska, D. & Sikora, T. 2001)

Having implemented GMP/GHP, HACCP and QACP systems, the next step could be to implement other quality systems, e.g. ISO-9000. The ISO-9000 series of standards represent the requirements which have to be addressed by every enterprise to assure the reliable production and timely delivery of goods and services to the marketplace. There is a body of literature and plenty of professional materials (both electronic and in print) concerning the quality management based on the ISO-9000 series of standards. Many food chain actors require their suppliers to become registered to ISO-9000 and because of that, those who registered find that their market opportunities have

³ Example: HACCP parameter and critical limit = temperature in Celsius degrees

⁴ Example: QACP parameter and critical value = sweetness in terms of amount of sugar

increased. Nevertheless, despite being very popular, ISO- series are not, and are not going to be, obligatory.

Figure 6.5 illustrates the full range of the safety and quality assurance and management systems and the relationship between them. Considering the above, it is important to make a distinction between the terms “assurance” and “management”. The term “assurance” relates to a product itself and involves all the safety assurance systems (GMP, GHP and HACCP) and the quality assurance system QACP. On the other hand, the term “management” corresponds to a company’s overall organisation as regards the products’ quality (including safety), and involves the remaining Quality Management Systems QMS (ISO-9000, ISO-14000, etc.) as well as Total Quality Management TQM (Figure 6.5).

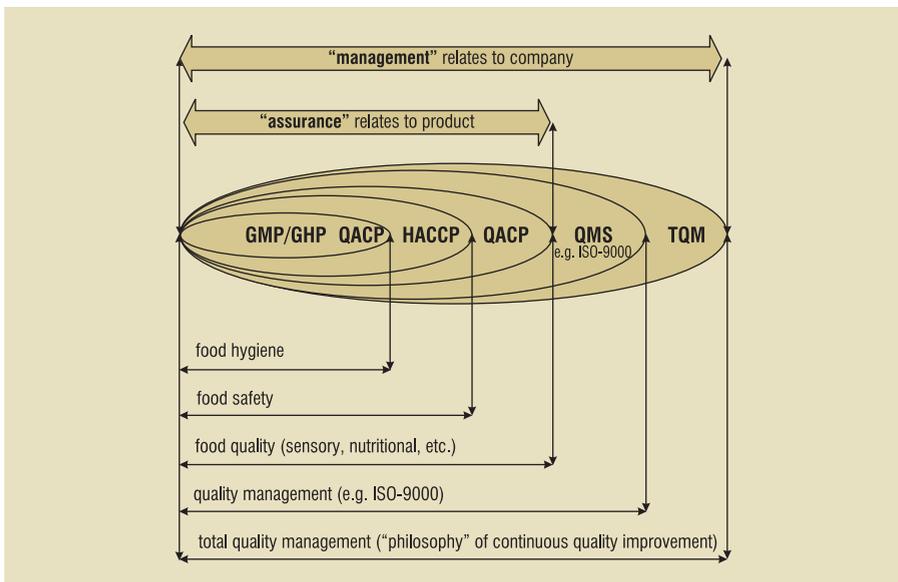


Figure 6.5 Diagram of the relationship between GMP, GHP, HACCP, QACP, QMS (ISO-9000, ISO-14000, etc.) and TQM (Sikora, T. & Strada, A.)

It is possible to implement ISO-9000 and HACCP together based on the norm ISO-15161 (Guidelines on the application of ISO-9001 in Food Industry). Currently, a new norm is being prepared (ISO/CD 22000) to internationally

harmonize the requirements of food safety management in food industry. Popularity of food safety systems (GMP/GHP, HACCP) and quality systems (e.g. ISO-9000) contributed to the development of traceability systems. A need for traceability emerged also from the growing consumers' concerns as regards food safety. In brief, traceability is a system allowing "tracing" the history of a product at all steps of the food chain. It refers to the origins of raw materials as well as the history of production and distribution of the product. However, because the subject is very extensive, and there is a body of literature and materials concerning food traceability, it will not be discussed here.

6.2.3 Certification

Holding a certificate confirming the quality of a company's products is not a legal requirement. Yet, having a certificate issued by an external institution (such as certifying firm) is part of the marketing strategy, shaping a positive view of a company in the eyes of its customers. This is with no doubt contributing to an increase in market opportunities and consequently, higher profits. In some cases, food enterprises apply for a certificate just because it is required by their clients, trading companies.

Certifying organizations have a very specific status. Being accredited by external state bodies or EU authorities, they remain private companies with the primary objective to earn profits out of the number of enterprises certified. Presumably, all food companies implementing ISO-9000 would apply for certificate in one of the certifying organizations, while HACCP might be less popular due to the fact that the system has to be implemented obligatorily. A certificate is usually granted for 3 years and paid for by the company who applied for it. Thus, the "quality" of certificates may differ dependent upon the reliability of certifying organization. Besides, a food company which realizes the fact that holding a certificate would not influence its sales would not decide to continue, after 3 years would give up certification whilst maintaining the system.

6.3 MAKING THE SYSTEMS WORK

As presented in Figure 6.6, an important feature which distinguishes food safety and food quality is that the former is regulated by law, while the latter is

demanded by those who purchase food (e.g. distributors and/or consumers). Consequently, food safety assurance systems are implemented obligatorily, whilst quality assurance and management systems are voluntary, thus the decision whether to introduce them or not is to be taken by the food chain actors individually. Figure 6.6 summarizes the relationship between food legislation, safety and quality systems, official inspections and customers' requirements. The combination of these elements forms a machinery of food safety and quality assurance and management.

Food law represents a set of legal norms regarding the principles of production and distribution of raw materials, foodstuffs and objects getting in direct contact with them, to the level which ensures consumer health protection and fulfil consumer expectations as regards food safety. Due to the fact that in the European countries, food law is implemented through the safety assurance systems exclusively⁵ (namely GMP, GHP and HACCP), there is no direct link between food law and food safety per se. Both the EU law (Table 6.2) and national law⁶ regulate this issue via the systems. Hence, their implementation needs to be officially supervised by the state inspections, whose activity is also regulated by law. Figure 6.6 also draws a link between official inspections and quality assurance systems. Despite being implemented voluntarily, food quality may also become a subject for official inspections in terms of conformity between the actual qualities of the product and those declared by a food chain actor. The same applies to food safety. On the other hand, customers may expect food chain actors to have implemented quality assurance and management systems (confirmed by a certificate) not just because of their expectations as regards the product itself, yet being concerned whether the company conducts environmentally friendly practices (e.g. according to ISO-14000 standards).

The fact that the customers' expectations influence the quality and safety of food products seems obvious in that each producer should be concerned about his own reputation at the marketplace. Selling low quality products or unsafe food appears suicidal to a company who would conduct such practices. Unfortunately, such instances do occur, therefore other measures are required to protect the consumers' health and assure that food products meet their expectations.

5 In the past, food law regulated this issue without a systemic tool.

6 EU regulations are applied directly, while directives are first implemented into the national law. Details regarding Polish food law will be provided in Chapter 7.

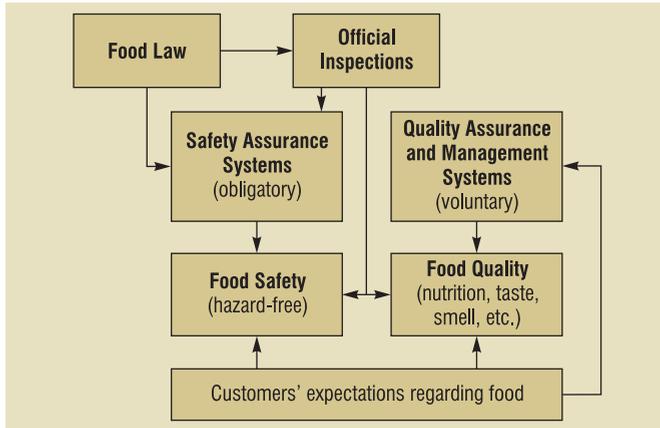


Figure 6.6 Integrated diagram of the role of food law, official inspections and consumers' expectations as regards food quality and safety (Strada, A. & Sikora, T.)

Table 6.2 The European Union Food Law Main Directives and Regulations

European Union Food Law embraces the following:
<ul style="list-style-type: none"> • 93/43/EEC Council Directive on the hygiene of foodstuffs; • Regulation 178/2002 defining general food safety rules and establishing of EFSA; • Regulation 852/2004 on the hygiene of foodstuffs to replace 93/43/EEC Council Directive; • Regulation 853/2004 on the hygiene of foods of animal origin; • Regulation 854/2004 determining the control points of foods of animal origin.
Regulations: 852/2004, 853/2004, 854/2004 (29 April 2004) will apply from 1 January 2006.

It is necessary to remember, however, that no system can work without ethics (Figure 6.7). The role of ethics in the food industry was recently brought up in Poland, following a food scandal in a well known meat plant, which was suspected to be conducting unsanitary practices. When supermarkets returned deli meats after they expired, the plant did not destroy them as required, but they were reprocessed, re-packed and re-sold to the stores. Despite frequent sanitary inspections, these practices persisted until the undercover TV reporter (who took a job as a plant worker and subsequently documented these practices) made the discovery and unveiled it to the public.

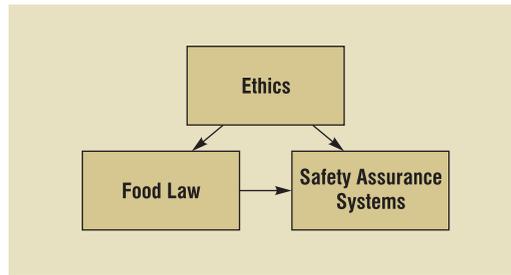


Figure 6.7 Diagram of the role of ethics in food law and food safety (Sikora, T.)

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