

## METHODS AND SYSTEMS OF FOOD QUALITY AND SAFETY ASSURANCE

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The most important aspect for consumers referring to food production is its safety. Due to that producers must assure food safety and health. For this reason enterprises implement systems which are helpful in a complex food production chain. Food producers are guided by those systems on how to make a safe product and by using them eliminate any possible hazards that may appear. The most common and obligatory systems are GMP/GHP rules and HACCP system. Enterprises also implement quality assurance and management systems such as ISO 9000. In addition, this paper includes a description of those systems and their common applications and relationships. It also shows the importance of traceability and role of ethics in food law and food safety.

### INTRODUCTION

For consumers, the most important food quality characteristic is health-related food safety. Thus, all the food laws stipulate clear-cut food safety requirements, and, owing to this fact, consumers may feel confident that the food purchased by them meets their safety expectations. Regulations under those laws determine requirements on how food safety should be ensured, and, at the same time, they recommend the implementation of comprehensive practical solutions allowing for this aim to be achieved.

Conditions of the production process and of acquiring raw materials can directly or indirectly affect the safety of products manufactured. The following systems belong to a group of obligatory systems ensuring food safety: Good Manufacturing Practice (GMP), Good Hygienic Practice (GHP), and Hazard Analysis and Critical Control Point (HACCP).

Modern systems of health-related food safety are based on a concept of creating appropriate conditions during food production processes and turnover procedures which permit the food product to be of the optimal quality. Under such systems, it is necessary to identify levels of quality distinguishing features, potential hazards and quality of the final product. In addition to the quality assurance, it is also vital to ensure a proper quality level of all the other product characteristics with reference to the consumer expectations. However, one fact should be highlighted: while the food safety is a subject matter of regulations in force, the other food characteristics are a subject matter of the consumer acceptance only. Thus, for the purpose of ensuring a suitable and accepted by consumers food quality, food operators should implement quality assurance systems (e.g. QACP) and quality management systems (for example according to standards of ISO, series 9000).

### FOOD QUALITY AND SAFETY

Figure 1 has been drawn in attempt 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 in respect of 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 their efforts to improve food safety in response to an increasing number of food safety problems and growing consumer concerns as regards various food risks.

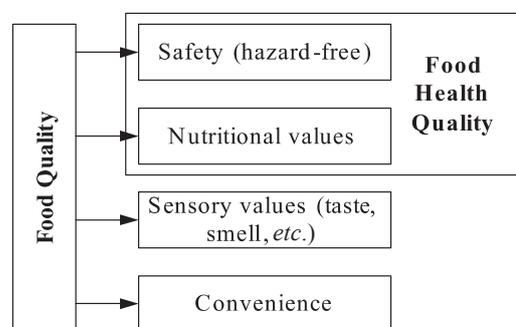


FIGURE 1. Diagram of the relationship between food quality, food health quality and food safety traits [Sikora & Strada, 2005].

Besides, it is important to distinguish between the terms “food quality” and “food health quality”. As demonstrated in Figure 1, these two remain in a relationship, namely food health quality embraces only the health-related traits (that is, hazard-free and nutritional value), whilst food quality is 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.*).

In order to preserve the above quality features in food products, various safety and quality assurance systems have been developed. Any system constitutes 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 actors (Figure 2).

Food production particularly comes out of the fact that a food operator must fulfill all requirements that are specified in all law regulations, that refer to parameters of safety and other quality features of consumer demands, *e.g.* sensory features.

Food which is being produced must be completely safe for consumers’ health. In connection with that, the application of methods and systems that ensure the production of healthy and safe food and fulfill levels of safety specified in food law is very important.

Full responsibility of a food producer for a product’s safety must be displayed in: keeping the law; using GMP/GHP rules; implementing and running the HACCP system; proper labeling of products that allows consumer to make a right choice; and using subsystems, programs, tools that enable identification of raw products used in the food production process.

It should be emphasized that almost each enterprise has different elements of widely understood quality management system implemented. Each enterprise from the food sector must ask itself the following questions concerning the safety of produced food: (1) How to guarantee the safety and high quality of products? (2) What should be done to maintain health safety at a proper, stable and accepted level?

It is obvious that most of enterprises from the food sector have already been implementing systems which are obligatory by virtue of acts about health conditions of food and nutrition (Good Manufacturing Practice - GMP, Good Hygienic

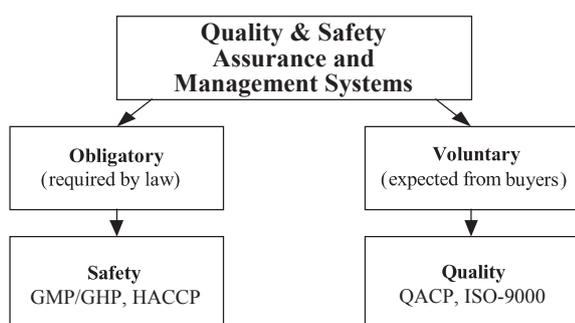


FIGURE 2. Diagram of voluntary vs. obligatory quality and safety systems [Sikora & Strada, 2005].

Practice - GHP, and system of Hazard Analysis and Critical Control Point - HACCP). However, the interest in implementing voluntary systems such as quality management system, environment management system or work safety and hygienic management systems is much smaller.

### WHAT SHOULD BE DONE BEFORE IMPLEMENTING THE SYSTEM?

At first the following question must be asked: What should we start implementing the food safety assurance systems in the enterprise from? Each management system can be expressed as a route of three steps (Figure 3).

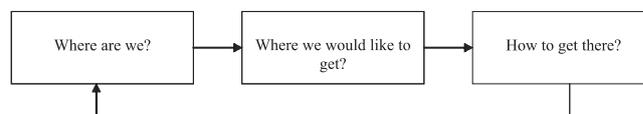


FIGURE 3. Stages before system implementation [Bockelman von., 1995].

#### Where are we?

At first, the organization of the enterprise should be evaluated, as we need to know which elements of the system have already been functioning in our organization. It refers to all elements of food safety management systems and of its quality assurance. This evaluation should be done on all levels of management: documentation check (instructions, procedures, other documents functioning in organization, *e.g.* recording forms); evaluation of technical condition of objects in the aspect of product hygiene and safety assurance; evaluation of vertical and horizontal communication, *etc.*, assuming that it is necessary to evaluate all elements of organization considering its usefulness in the food safety management system.

#### Where would we like to get?

Organization’s management should define the aim to be achieved, therefore they have to make a decision on which systems should be implemented in the enterprise – whether obligatory systems or voluntary ones. In order to assure food safety enterprises from the food sector should implement and function according to GMP, GHP and HACCP systems. The top management may also want to implement the quality management system at the same time.

#### How to get there?

It is necessary to define what should be done, how much money it will consume, who will be in charge of the implementation team, and who will join the team. At this point it should be underlined that all law requirements must be checked before any action. Producers, wholesale dealers, food sellers and consumers have been interested in guaranteed quality food for a long time, but there have not been any effective methods ensuring that the offered food guarantees its safety for consumers.

**Quality assurance food** can be defined as products to which in the entire chain of gaining, food processing, distribution up to consumer, there were applied systems that guaranteed meeting the quality requirements, which enabled obtaining a product with expected parameters [Sikora, 1995].

#### **Law regulations referred to food hygiene and safety assurance**

All regulations referred to rules of production and food turnover are generally called Food Law. It can be defined as 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 fulfills consumer's expectations. Law regulations referred to food health quality are compiled in Codex Alimentarius both for European Union law and Polish law.

### **FOOD SAFETY LAW REGULATIONS**

#### **Codex Alimentarius**

Codex Alimentarius Commission is an author of Codex Alimentarius which is the main source of information about the HACCP system and defines its gaps. At the beginning of 1990, the HACCP system was approved by the FAO/WHO commission and included into Codex Alimentarius. It describes requirements for hygiene rules in the food chain and rules of the HACCP system, stages of its implementation as well as its definitions.

#### **United Europe Food Law**

United Europe Law is still being adjusted to new requirements connected with health safety and consumers economical affair. The direction of changes of this law was proposed in "Green Book" in 1997 by the European Commission and in "White Book referred to food safety" of the January 12, 2000. The European Council and European Commission together with European Parliament have begun to amend the food safety law which should have had more homogeneous, clear and complete shape.

The European Parliament and Council accepted regulation 178/2002/UE on January 28, 2002 (*General Food Law Regulation*) – this document has a fundamental meaning for setting up food law in the future. This regulation is the first document of this range.

This regulation serves to: (a) create the basis of high level human's health protection and consumer expectations; (b) describe common expedient which allows to ensure solid scientific basis, effective organizational procedures that support decision process in the range of food and feeding stuff safety; (c) establish main rules that adjust food and foodstuffs matter in general and food safety in particular on country and European Union level; (d) establish European Food Safety Authority; and (e) applies to all stages of production, processing, and distributing of food and foodstuffs. There is no usage in personal use production, processing or storing food.

Food law should be built on risk analysis and results of scientific researches, and should be implemented in a very independent, clear and objective way.

It can be said that the strategy of the European Union in food safety range is based on three pillars: (1) Horizontal acts regarding the principles of food law and hygiene; (2) European Food Safety Authority (EFSA); and (3) Official controls and inspections.

The European Food Safety Authority (EFSA) was established on the strength of 178/2002 regulation. This agency is independent of Commission, and has the possibility to evaluate food chain functioning. It is based on scientific gains and proposals from food law. Among UE law acts referring to food we cannot forget about Directive 89/379/UE on the official control of foodstuffs. This directive, assuming that the human's health protection is the most important, concentrates first of all on inspection, choosing samples and analyses and because of that there is another directive which is its supplement. This is 93/43/EEC Council Directive on the hygiene of foodstuffs from June 14, 1993. It describes general rules referring to foodstuffs which must be kept during packing, storing, transporting, distributing, service and offering on sale or supplying it to the consumer. In relation to the HACCP system, this directive is particularly important as it holds food operators responsible for identification of all food health and safety hazards and other actions aimed at helping in controlling these hazards. Besides, in 93/43/EEC directive there are other law acts that refer to particular products' hygiene such as meat, milk, eggs, and fish. This directive refers to General Food Hygiene Rules that are enclosed to FAO/WHO Codex Alimentarius, and also recommends the use of ISO 9000 norms to implement the quality management system.

After all regulations about hygiene come into force, programs for self control and hazard management will be obligatory for all enterprises from the food chain. It requires the harmonization of HACCP systems and coverage of the entire production cycle, processing, transport and food distribution.

Regulation (EC) no 852/2004 of the European Parliament and of The Council of 29 April 2004 on the hygiene of foodstuffs was committed to set in order all laws referring to food hygiene which were included in 93/43/EEC on the hygiene of foodstuffs and many other directives of the Council referring to public health and regulating rules of food production.

Regulation of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules on the hygiene of foodstuffs of animal origin describes special requirements about operators in the range of hygiene observance of food of animal origin (meat, eggs and milk). All those regulations came into force 20 days after their announcement and will not be in use until January 1, 2006. Thus, the strategy of UE in the range of widely understood food safety plans is to built and reform those three pillars on which the strategy is based.

#### **Polish Food Law**

The first Polish act obliging implementation of HACCP in Poland was the Regulation of Health Ministry of the 22 August 1996 introducing HACCP as obligatory for food supplements and dietetics. Then, the Act of 11 May 2001 on

Health Conditions of Food and Nutrition introduced HACCP as obligatory at first for large enterprises, and in the following amendments for medium and small ones. It clearly states that they would begin the HACCP implementation activities before the EU accession on the 1 May 2004. This act describes:

1. Requirements in the range of food health quality of permitted supplements and other food ingredients and processing help substances.
2. The conditions of production and turnover and requirements for the monitoring of hygiene rules in the production process and in turnover of the articles that are mentioned in 21 paragraph, and materials and products designed to contact with foodstuffs in order to assure the proper food health quality.
3. Rules of official food control.

There has also been defined for the first time in the Polish law the idea of food. Food is every substance or transformed product, partly transformed or not transformed at all, designed for consumption by people, including drinks, chewing gums, water and ingredients that are added to food intentionally during the production process. Food does not include products for animals feeding, alive animals, if they are not inserted to the production process as food straight for the consumer, plants before collecting, healing products, cosmetics, tobacco and tobacco products, stupefying products and dirt.

In the range of food hygiene there are following regulations:

- Regulation of the Ministry of Health of the April 26, 2004 on hygienic requirements in plants that produce or introduce foodstuffs onto the market. It says that the manager of the enterprise, considering food safety, undertakes actions that will realize hygienic and sanitary requirements referred to the enterprise and its equipment, sanitary conditions and requirements on complying hygienic rules at every stage of the production process and food turnover, where all important parameters of food safety assurance should be registered.
- Regulation of the Ministry of Health of the December 19, 2002 on sanitary requirements referred to means of food transport, processing help substances, allowed added substances and other ingredients of food.
- Another regulation of the Ministry of Health of the April 30, 2004 on internal food health quality control and on complying hygienic rules in the food production process. It provides particular range, methods and ways of internal food health quality control and complying hygienic rules in the production process referred to as "internal control", including all HACCP system rules in food branch enterprises. This regulation came into force on May 28, 2004.

## TRACEABILITY

Because of food safety assurance it is important to implement the trace system which affords the possibility to follow all the food chain backwards *e.g.* from final product to raw materials including all stages of production and distribution. The basic document describing this system is Regulation

(EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down general principles and requirements of food law, establishing the European food safety authority and laying down procedures in the matters of food safety. In article 3 point 15, this regulation gives a definition of traceability which means the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution. While stages of production, processing and distribution mean any stage, including import, from and including the primary production of a food, up to and including its storage, transport, sale or supply to the final consumer and, where relevant, the importation, production, manufacture, storage, transport, distribution, sale and supply of feed.

Traceability is also required in quality management system such as ISO 9000. In PN-EN ISO 9000:2000, traceability means the ability to follow the history, adoption or localization of the considered subject. If the product is being considered the traceability may refer to: source of parts and materials, production history, and distribution and product localization after it is being supplied.

The responsibility of traceability of food and its ingredients is an obligatory requirement of food health and safety assurance systems (GMP/GHP and HACCP).

The need of implementation of traceability systems results from the fact that there have been a number of famous scandals connected with some threats to food safety in European Union at the end of the last century, such as mad cows disease or dioxin contamination in feed. The regulation prompted all member countries to implement the traceability systems before January 1, 2005. In its warrants we can read that:

- In order to ensure the safety of food, it is necessary to consider all aspects of the food production chain as a continuum from and including primary production and the production of animal feed up to and including sale or supply of food to the consumer because each element may have a potential impact on food safety.
- Experience has shown that the functioning of the internal market in food or feed can be jeopardized where it is impossible to trace food and feed. It is therefore necessary to establish a comprehensive system of traceability within food and feed businesses so that targeted and accurate withdrawals can be undertaken or information given to consumers or control officials, thereby avoiding the potential for unnecessary wider disruption in the event of food safety problems.
- It is necessary to ensure that a food or feed business including an importer can identify at least the business from which the food, feed, animal or substance that may be incorporated into a food or feed has been supplied, to ensure that on investigation, traceability can be assured at all stages.

Article 18 also tells about traceability:

1. The traceability of food, feed, food-producing animals, and any other substance intended to be, or expected to be, incorporated into a food or feed shall be established at all stages of production, processing and distribution.

2. Food and feed business operators shall be able to identify any person from whom they have been supplied with a food, a feed, a food-producing animal, or any substance intended to be, or expected to be, incorporated into a food or feed.

To this end, such operators shall have in place systems and procedures which allow for this information to be made available to the competent authorities on demand.

3. Food and feed business operators shall have in place systems and procedures to identify the other businesses to which their products have been supplied. This information shall be made available to the competent authorities on demand.
4. Food or feed which is placed on the market or is likely to be placed on the market in the Community shall be adequately labelled or identified to facilitate its traceability, through relevant documentation or information in accordance with the relevant requirements of more specific provisions.

There is also a new project of the norm ISO/CD 22519: *Traceability in feed and food chain – General principles and guidance for system design and development*.

Assuming that it is necessary to say that the traceability system (following the trace) should ensure complete trace of food ingredients, its origin, and it should help to reconstruct the history of developing a product.

## **OBLIGATORY SYSTEMS OF FOOD HEALTH AND SAFETY ASSURANCE**

In the case of food health and safety assurance producers and introducers of food onto the market must implement and follow assurance systems for food safety. These systems are: (1) Good Manufacturing Practice (GMP); (2) Good Hygienic Practice (GHP); and (3) Hazard Analysis and Critical Control Point (HACCP).

### **Good Manufacturing Practice – GMP**

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.

GMP refers to basic areas of enterprise activity, which should be on exact level to produce quality health food. Usage of GMP should be done on going by obligatory acts, in particular on some parts of it.

### **Good Hygiene Practice – GHP**

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 food chain in order to assure food safety. Obeying GHP rules is basically making all actions in the production process and in turnover of foodstuffs with assuring proper conditions to foodstuffs and their proper health quality.

However in the act of Health Conditions of Food and Nutrition, GMP and GHP are defined separately, it should be stated that both of these Practices are closely connected

to each other and both refer to hygienic requirements. GMP/GHP should be seen as one system that refers to hygienic requirements in food production and processing. Both of these Practices must be implemented and their running must be documented. Both GMP and GHP constitute a precondition in a food enterprise for implementing the HACCP system, that should look for the sequence of logical implementation of safety assurance systems.

### **Hazard Analysis and Critical Control Point (HACCP)**

This system was designed particularly to guarantee food health and safety. It is based on two pillars: health hazard analysis (biological, chemical and physical) and critical control points that are settled after hazard analysis is being completed.

Food turnover and its offering to consumers are very important links of a food chain (“from ground to the table”), and there is the necessity of proper manipulating with food and assuring its safety. Not obeying to particular conditions (e.g. of food storage) in these links may pose health danger to consumers. It is also necessary to focus on all factors that have a great impact on food safety assurance. It is obvious that it is not possible to achieve this aim by using traditional ways in creating the quality, which is basically controlling of the final product only. There is also the necessity of implementing more effective methods which can guarantee the production of guaranteed food health quality. The idea of the HACCP system is based on the assumption that all potential hazards and abnormalities in the production process will be identified before or during this process of production or distribution of food, always on time to minimize or delete them. Prevention of hazards before they are manifested is the basic aim of this system. This system was first designed especially to eliminate all microbiological hazards and secondly to apply it to other biological, chemical and physical hazards. Nowadays it has been said that the HACCP system should regulate all parameters that are the basic meaning referring to consumers’ health. HACCP is a system of critical control points settled down on the basis of hazard analysis. It has been realized on the basis of seven rules that are determining the basic stages of its implementation. The first basic stage is hazard analysis consisting in the identification of potential dangers connected with food production at all stages until the consumption. Such a hazard analysis is difficult and the correctness of results determines all proper functioning of the system. Good hazard analysis enabled setting critical control points (process or particular action where control actions can be made in the case of minimizing, preventing or eliminating hazards). Next stage is to create monitoring procedures that make it possible to observe and register actions in critical control points and enable correcting the actions in the moment where the parameters are out of scale [Kołozyn-Krajewska & Sikora, 1999; Kijowski & Sikora, 2003].

Implementation of the HACCP system requires designing the proper documentation. The HACCP system prompts to: change habits; reanalyze all processes in enterprises, even in places where everything goes without any problems; and move responsibilities to workers directly connected with particular stages of the food production process, forcing them to watch critical control points.

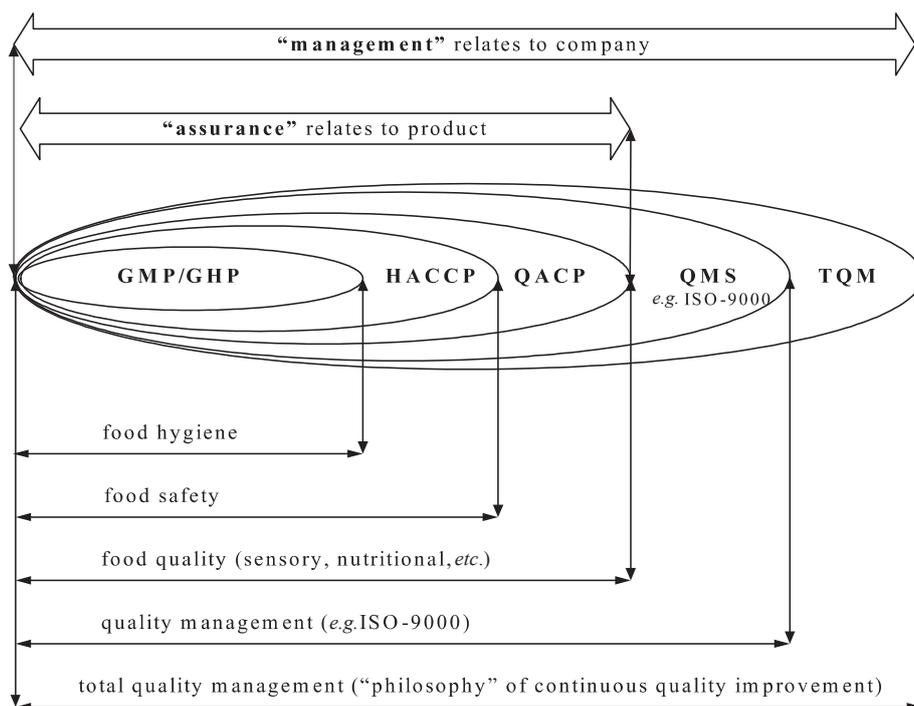


FIGURE 4. Diagram of the relationship between GMP, GHP, HACCP, QACP, QMS (ISO-9000, etc.) and TQM [Sikora & Strada, 2005].

Implementation of the HACCP system requires: performing detailed hazard analysis; designing critical control points (CCP) and control points (CP) if needed based on hazard analysis; and designing the monitoring procedure which will make it possible to observe and register actions in critical control points and enable using correcting actions when discordance is found.

The HACCP system refers to the entire production process from production of raw materials until consumption of the final product.

In comparison to traditional methods, the HACCP system is: systematic (realization of seven basis rules); specific (individually designed in every enterprise); preventive (prevents all food hazards); critical and creative (searching for new solutions); and requires team work (different specializations workers involved).

The main reason for implementing the HACCP system in the food industry enterprises is to rise trust between all participants of the market in the local field as well as in European Union, because basic rules of food production in European countries include rules of the HACCP system.

According to the act of Health Conditions of Food and Nutrition the manager or a person who was selected by him must implement and run the HACCP system. It does not refer to producers of raw materials (basis production) who have to implement rules of the GMP/GHP system. After implementing those obligatory systems it is possible to implement other quality management systems such as QACP or ISO 9000 system, but all these systems after implementation must be integrated together [Sikora & Kołozyn-Krajewska, 2001]. Figure 4 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. In contrast, the term “management” corresponds to a company’s overall organization as regards the products’ quality (including safety), and involves the remaining Quality Management Systems QMS (ISO-9000, etc.) as well as Total Quality Management TQM (Figure 4). ISO 9000 is the system of international quality norms. Its aim is to unify the system solutions referred to quality management in enterprises that want to implement it [Luning *et al.*, 2005; Kijowski & Sikora, 2003].

#### **Benefits coming from implementation and running the HACCP system [Kołozyn-Krajewska, Sikora, 1999]:**

1. Permanent final product control is not required.
2. Guarantees food production without health hazards.
3. A preventive characteristic ensures acting before problems may happen.
4. It rationalizes treatment to hazard control.
5. Critical control points monitoring uses parameters that allow acting fast if there is such a necessity.
6. Reducing costs of all participants of the food market (less tests, less accidents, less complaints, happy consumers, less losses at each stage).

#### **Difficulties in implementing and functioning of the safety system in an enterprise [Kołozyn-Krajewska & Sikora, 1999]:**

1. Lack of law knowledge.
2. Knowledge of GMP/GHP and HACCP system is poor.
3. Lack of specialists in the enterprise.
4. Poor motivation.

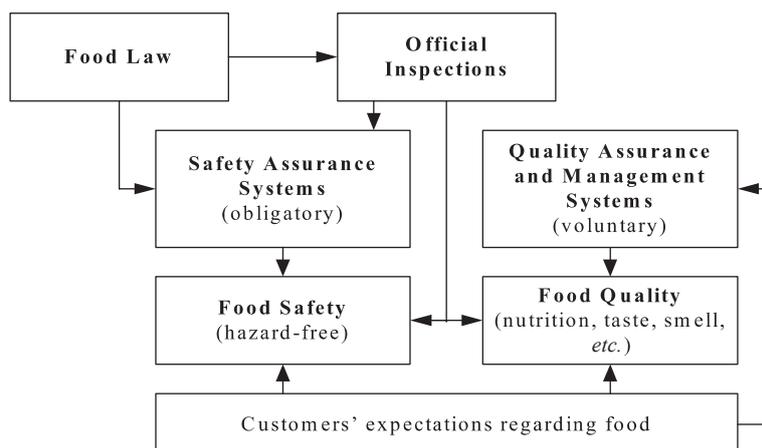


FIGURE 5. Integrated diagram of the role of food law, official inspections and consumers' expectations as regards food quality and safety [Sikora & Strada, 2005].

5. Lack of funds for implementation.
6. Poor technical conditions of buildings, equipment *etc.*
7. Lack of time for implementation.
8. Lack of crew leader who might implement the system.
9. Copying the system from other similar enterprises or buying "ready to use" documentation.
10. Too many critical control points identified.
11. Impossibility of identification of real hazards.

## CONCLUSIONS

Food safety is the most important feature of quality. Because of law acts that particularly regulate this sphere and implementation and functioning of the safety assurance system, consumers are sure that food they buy fulfill their expectations in the range of lack of health hazards. Consumers are also expecting that their expectations about all other quality parameters, which depend from their acceptance, will be met as well. Supporting these parameters at a stable level is very important.

Generally it can be said that the main aim of implementing the HACCP system is the assurance of food health and safety so that the final effect meets both producer and official inspections' interests, but first of all - consumers' interest (Figure 5).

It is necessary to remember that in the food industry beside following the food law acts and food safety assurance systems, no system can work without ethics (Figure 6).

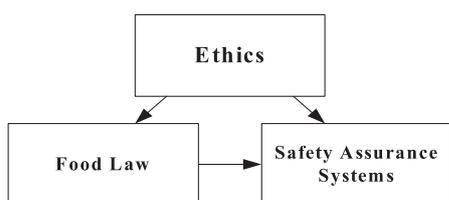


FIGURE 6. Diagram of the role of ethics in food law and food safety.

## REFERENCES

1. Bockelmann von B., The HACCP (Hazard Analysis and Critical Control Point) Concept: a Tool of Quality Assurance. 1995, *Von Bockelmann Hygiene* (type-script).
2. Codex Alimentarius: HACCP System and Guidelines for its Application. Food Hygiene Basic Texts, FAO/WHO, Rome 2001.
3. ISO 9000:2000: Quality management systems – Fundamentals and vocabulary.
4. ISO 9001:2000: Quality management systems – Requirements.
5. ISO 9004:2000: Quality management systems – Guidelines for performance improvements.
6. ISO 15161: Guidelines on the application of ISO 9001:2000 for the food and drink industry.
7. ISO/CD 22000: Food safety management systems – Requirements.
8. ISO/CD 22519: Traceability in feed and food chain – General principles and guidance for system design and development.
9. Kijowski, J., Sikora, T. (editors), Zarządzanie jakością i bezpieczeństwem żywności. Integracja i informatyzacja systemów. 2003, WNT, Warszawa (in Polish).
10. Kołożyn-Krajewska, D., Sikora, T., HACCP. Koncepcja i system zapewnienia bezpieczeństwa jakości, 1999, SITSpoż, Warszawa (in Polish).
11. Luning, P.A., Marcelis, W.J. and Jongen, W.M.F. Food quality management: a techno-managerial approach. 2005, WNT, Warszawa (in Polish).
12. Sikora, T., Kołożyn-Krajewska, D., Assurance of quality and health safety of food. *Przem. Spoż.*, 2001, 6, 55, 15-18, 25 (in Polish).
13. Sikora T., Quality assurance food. *Przem. Spoż.*, 1995, 6, 203-205 (in Polish).
14. Sikora T., Strada A., Safety and Quality Assurance and Management Systems in Food Industry: An Overview, 2005, Athens (in print).

## METODY I SYSTEMY ZAPEWNIENIA JAKOŚCI I BEZPIECZEŃSTWA ŻYWNOŚCI

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Bezpieczeństwo zdrowotne żywności jest dla konsumenta najważniejszą cechą jakości, stąd też prawo żywnościowe szczegółowo reguluje tę kwestię dając konsumentowi pewność, że żywność, którą nabywa spełnia jego oczekiwania pod względem bezpieczeństwa. Regulacje prawne określają wymagania dotyczące zapewnienia bezpieczeństwa żywności i jednocześnie zalecają wdrożenie konkretnych rozwiązań systemowych, które pozwalają osiągnąć ten cel. Warunki produkcji i pozyskiwania surowców mogą mieć bezpośredni lub pośredni wpływ na bezpieczeństwo otrzymywanych produktów.

Do obowiązkowych systemów zapewnienia bezpieczeństwa żywności należą: Dobra Praktyka Produkcyjna (GMP), Dobra Praktyka Higieniczna (GHP) i Analiza Zagrożeń i Krytyczny Punkt Kontrolny (HACCP). Podstawą nowoczesnych systemów jakości zdrowotnej żywności jest koncepcja tworzenia takich warunków produkcji i obrotu, które pozwolą na otrzymanie wyrobów jakościowo optymalnych. W systemach tych konieczne jest określenie poziomów wyróżników jakości, potencjalnych zagrożeń i określenie jakości wyrobu gotowego.

Obok zapewnienia bezpieczeństwa istotne jest także zapewnienie odpowiedniego poziomu jakości pozostałych cech produktu uwzględniając oczekiwania konsumenta. Należy jednak podkreślić, że bezpieczeństwo żywności jest przedmiotem regulacji prawnych, natomiast pozostałe cechy jakości są przedmiotem akceptacji konsumenta. Jednak operatorzy żywności chcąc zapewnić odpowiednią, akceptowaną przez konsumentów jakość powinni wdrożyć systemy zapewnienia jakości (np. QACP) i zarządzania jakością (np. według norm ISO serii 9000).

Uznając przemysł spożywczy za główne ogniwo w zapewnieniu konsumentowi bezpiecznej żywności należy pamiętać, że bez stosowania zasad GAP, GMP/GHP i systemu HACCP w całym łańcuchu żywnościowym nie ma pewności wyeliminowania ryzyka związanego z zagrożeniem zdrowia i życia konsumenta. Należy jednak podkreślić, że obok prawa żywnościowego i wdrożenia systemów zapewnienia bezpieczeństwa i zarządzania jakością muszą być przestrzegane normy etyczne w biznesie żywnościowym.