



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Marcin Olkiewicz

Koszalin University of Technology, Poland

INTERNATIONAL STANDARDS OF QUALITY MANAGEMENT AND FOOD SAFETY

MIĘDZYNARODOWE STANDARDY ZARZĄDZANIA JAKOŚCIĄ ORAZ BEZPIECZEŃSTWEM ŻYWNOŚCI

Słowa kluczowe: jakość, standardy, systemy zarządzania jakością, bezpieczeństwo żywności

Key words: quality, standards, quality management systems, food safety

Abstract. The article examines the essence of undertaken quality-promoting activities, based on the international standards of quality management and food safety in a complex food chain. Moreover, it exposes the specificity of the aforementioned international standards. The studies, which were conducted by the author, show that in the former Middle Pomeranian province, among 141 agribusiness entities (regardless of the size of organization and specificity of activity), there is a differentiation in the use of voluntary, international standards aimed at guaranteeing food quality and safety in the complex food chain.

Introduction

The development of food technology and human nutrition has led to an increased awareness of social responsibility and the need to improve the living conditions of future generations. This involves the creation of appropriate strategies to preserve a balance between civilizational development (including: technical and technological, computer science, chemical development, etc.), and concern for the natural environment. Moreover, it stimulates actions that increase the satisfaction and fulfillment of customer needs. The balance of these aspects is very important, so through the use of proper quality tools (standards and management systems), we can systematically interact with entities which ensure the maintenance of appropriate quality and safety of agricultural products and food, as well as customer health. The increasing awareness of new and existing risks in the food chain reduces clients' confidence in the consumption of goods, which are not supervised by adequate quality management systems. It is believed that the lack of appropriate quality standards significantly reduces the functioning and development of the agri-food sector and minimizes its competitiveness on the domestic and international market.

Materials and methodology of research

The aim of this study is to raise issues related to the use of systems and/or quality management standards, which are necessary to ensure required quality and food safety in the complex food chain. These deliberations are based on the thesis that adequate systems and quality management standards determine the effective security of food safety and appropriate functioning and development of entities from the agri-food sector. The studies were based on an analysis of domestic and foreign academic literature on the subject, data from certification bodies and results of the author's empirical research performed in 2011, among 141 entities from the agri-food sector in the former Middle Pomeranian province.

The essence of quality and food security

Quality is an interdisciplinary concept; therefore an unambiguous interpretation of the term is difficult. However, in the academic, source literature, quality is most frequently defined as [Olkiewicz 2013]:

- a certain level of perfection – Plato,
- compliance with requirements – P.B. Crossy,
- set of characteristics and properties of the product and service connected with the ability to satisfy stated and anticipated needs – ISO 8402:1994,
- a degree, in which a set of inherent characteristics meets the requirements – ISO 9001:2006,
- realization of a set of requirements. A full fulfillment of these requirements means the achievement of a relative state of perfection – R. Kolman, T. Tkaczyk,
- something that can be improved – E. Skrzypek,
- a sum of the characteristics of products and services, which decide about the ability of the product to meet specific needs – Ph. Kotler.

From the perspective of a complex food chain analysis, quality will be considered by the customer in accordance with a product's attributes (i.e. parameters of product's raw material, nutritional value, sensory experiences [Kołozyn-Krajewska, Sikora 2010], etc.) and information contained on packaging labels.

The guarantee of quality and safety [Dz.U. from 2006, no. 171, pos.1225, incl. further changes] of agri-food products by agribusiness entities requires continuous controls and supervisions [Kieleska 2012] in order to eliminate the risk connected with chemical, biological and physical threats [Zalewski 2004]. This means that quality – in the complex food chain – is an effect of compliance with all conditions and necessary actions to ensure the health safety of food and its production in accordance with the original purpose [*Joint FAO and WHO...* 2008]. These include:

- natural environment,
- raw materials (agricultural products),
- processing of raw material into a product,
- final product,
- availability of a product (distribution with logistics).

Traceability [Olsen, Borit 2013] in the food chain process makes it possible to improve the quality of manufactured products (determined by assurance and quality management systems) through effective and efficient control [Norma PN-ISO 9000:2006]. This maintains the quality of products on an adequate (acceptable) level in the long term [Sisco i in. 2010]. It should be remembered that acceptable quality in the food chain guarantees food safety. This is achieved by all entities in the chain, which should have an awareness of public responsibility [*Communication from the Commission...* 2011], also resulting from the letter of the law [Kołozyn-Krajewska, Sikora 2010]. The fulfillment of customer expectations shapes a positive image and – from an economic perspective – improves the competitiveness of agri-food entities in Poland and abroad, giving opportunities for sustainable development.

Quality-focused standards for safety

Ensuring food safety with a high level of quality is a necessity in the era of rapidly growing customer expectations and the globalization of agri-food entities' activity. Security is guaranteed by the following types of control: external and internal. External control (independent of the agri-food entity) is based on a control system within the framework of state institutions (VI – Veterinary Inspection, STI – State Trade Inspection, SSI – State Sanitary Inspection, MIPHSP – Main Inspectorate of Plant Health and Seed Inspection, AFQI – Agricultural and Food Quality Inspection). This control system is created within the resorts (ministries) of agriculture and rural development, health and the Office for Competition and Consumer Protection (Polish – UOKiK). The internal control system is connected with the observance of certain forms of proceedings by entities, inter alia: HACCP (Hazard Analysis and Critical Control Points), GMP (Good Manufacturing Practice) and GHP (Good Hygienic Practice), ISO 22000 (Food Safety Management System), and others. The existence of the internal control system is dependent on the entity's awareness of the need to have and preserve food safety and development of expected quality on a voluntary basis both in connection with the use and confirmation of such actions by external institutions.

External certification bodies, as independent entities (in the majority subject to accreditation), carry out the process of conformity assessment for organizations within the framework of international quality standards, quality assurance systems and quality management systems (including food safety systems) and this is confirmed by an appropriate certificate or attestation. In Poland, there are about 80 certification bodies, e.g.: PCBC Sp. z o.o., DQS Polska Sp. z o.o., PRS Sp. z o.o., TÜV RheinlandPolska Sp. z o.o., BVQI Polska Sp. z o.o., and others. For example, within the framework of organic food, the following certification bodies¹ can be included: PCBC S.A., TÜV RheinlandPolska Sp. z o.o., SGS Polska Sp. z o.o., Centrum JakościAgroEko Sp. z o.o., EKOGRWARANCJA PTRE Sp. z o.o., PNG Sp. z o.o., COBICO Sp. z o.o., BIOEKSPERT Sp. z o.o., BIOCERT MAŁOPOLSKA Sp. z o.o. and AGRO BIO TEST Sp. z o.o.

In Poland, the most common international quality-focused standards in the agri-food industry include: HACCP, GMP, GHP, BRC, IFS, GLOBAL G.A.P., ISO 22000 and ISO 9001.

Figure 1 presents areas of quality and safety shaping philosophy in the agri-food sector. The first area is a base of the system in accordance with current legal acts. It identifies and ensures the safety and quality of food products (GHP/GMP)² [Nowicki and Sikora 2012, Malinowska 2012], as well as standardization (BRC³/IFS⁴) [Morkis 2006, Popis 2013]. This area is a basis for the implementation of systems to ensure the security and quality of the food process. The HACCP system, required in Poland since May 1st 2004, is an analysis of hazards and critical control points as an independent food health security management system based on the principles of GMP and GHP.

Another system is GLOBAL G.A.P (*Global Partnership for Good Agricultural Practice*) – it is a voluntary and integrated system to ensure the safety and quality on a farms for all agri-food entities involved in primary production. This system is based on three core modules [Sałata 2012]⁵ for producers: arable crops (*Crops Base* – CB), animals (*Livestock Base* – LB) and aquaculture (*Aquaculture Base* – AB). It is aimed at guaranteeing appropriate food quality and security. There is increasing interest in this system around the world, including Poland, which is confirmed by the data in Table 1.

The next step in the development of food quality and safety is the ability to implement management systems from the ISO series. ISO 9001 and ISO 22000 standards are international and standardized guidelines for quality management in organizations. The *Quality Management System* (QMS) in accordance with ISO 9001 has become the foundation for total quality management (TQM) through its universality and flexibility of integration capabilities in quality management systems. The versatility of use (i.e. the possibility to function in each organization regardless of size, form and scope of activity and industry) causes that it is the most widespread quality-focused management system of the organization.



Figure 1. Fields of requirements and quality management and food safety tools
Rysunek 1. Obszary wymagań i narzędzia zarządzania jakością i bezpieczeństwem żywności

Source: own study

Źródło: badania własne

¹ Certification bodies approved by the MRiRW (15.05.2014).

² GMP and GHP the required from 20 July 2000.

³ BRC Global Standard Food, BRC Global Standard – Consumer Products, BRC Global Standard – Packaging, BRC/ FDF Non-GM Food Standard.

⁴ IFS Food, IFS HPC, IFS Global Markets Food, IFS Cash and Carry Wholesale, IFS Logistic, IFS Broker, IFS PAC-secure, IFS Food Packaging guideline, IFS Food Store.

⁵ www.globalgap.org/uk/en/search/index.html#, 10.04.2015.

Table 1. The number of certified entities within the framework of Global GAP in the years 2002-2014
 Table 1. Liczba certyfikowanych podmiotów w ramach Global GAP w latach 2002-2014

| Year/Lata | The number of certified entities/Liczba certyfikowanych podmiotów | | | | | | | | | | | | | |
|---------------|---|--------|--------|--------|--------|--------|--------|--------|---------|-----------------------|---------|---------|---------|--|
| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
| World/Świat | 4000 | 13 000 | 18 000 | 35 000 | 57 000 | 81 000 | 85 000 | 89 000 | 105 000 | 113 000 | 117 000 | 126 000 | 135 000 | |
| Poland/Polska | no. data/ brak danych | 2 | 28 | 79 | 288 | 351 | 396 | 754 | 1073 | no. data/ brak danych | | | | |

Source: own study based on [https://database.globalgap.org, www.centrumhaccp.pl]

Źródło: pracowanie własne na podstawie [https://database.globalgap.org, www.centrumhaccp.pl]

Table 2. The number of certified entities within the ISO 9001 in the years 2000-2013

Table 2. Liczba podmiotów certyfikowanych w ramach ISO 9001 w latach 2000-2013

| Year/Lata | The number of certified/Liczba podmiotów certyfikowanych | | | | | | | | | | | | | |
|---------------|--|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|-----------|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| World/Świat | 457 833 | 510 349 | 561 766 | 497 919 | 66 0132 | 773 843 | 896 905 | 951 486 | 980 322 | 1 063 751 | 1 118 510 | 1 079 228 | 1 096 987 | 1 129 446 |
| Europe/Europa | 269 332 | 269 648 | 292 878 | 242 455 | 32 0748 | 377 172 | 414 208 | 431 479 | 455 303 | 500 286 | 530039 | 459367 | 469739 | 485 554 |
| Poland/Polska | 2 622 | 2 622 | 3 091 | 3216 | 5 753 | 9 718 | 8 115 | 9 184 | 10 965 | 12 707 | 12 195 | 10 984 | 10 105 | 10 527 |

Source: own study

Źródło: opracowanie własne

This fact is confirmed by the data in table 2. This management system is aimed at (amongst others) the customer, staff involvement, approach to the process, continuous improvement, as well as the creation of appropriate relations with suppliers.

ISO 9001:2008 standard is directly focused on the following areas of requirements: management responsibility, management of resources and processes, identification of processes and measurements, continuous analysis and improvement.

ISO 22000 as the Food Safety Management System (FSMS) forces a possession of the implemented HACCP standard (joining the GMP and GHP Good Practices). Standardization of the system is based on areas of requirements for, inter alia: interactive communication (internal and external) and process management dependent on the identification of organization in the food chain. The ISO 22000 standard can be used individually or together with ISO 9001 – creating the Integrated Quality Management System (IQMS). There is increasing interest in ISO 22000, as evidenced by the data in Table 3.

Standardization in the agri-food sector, based on international requirements, is developing very well. It is also visible on the local market in the entire, former Middle Pomeranian province. Research, which was conducted between January and June 2011, showed a significant interest among agribusiness entities, in quality-focused actions aimed at international standardization. There were several reasons for this:

- requirements of European and global markets,
- requirements and expectations of customers,
- growing quality-focused, ecological and sanitary-epidemiological awareness among employees of the food chain's entities and clients,
- the necessity of creating competitiveness, an own brand or a positive image of the organization.

In practice, the complex management of food safety is manifested in the use of various forms and configuration

Table 3. The number of certified entities within the ISO 22000 in the years 2007-2013
 Table 3. Liczba podmiotów certyfikowanych w ramach ISO 22000 w latach 2007-2013

| Year/Lata | The number of certified/Liczba podmiotów certyfikowanych | | | | | | |
|---------------|--|-------|--------|--------|--------|--------|--------|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| World/Świat | 4 122 | 8 185 | 13 838 | 18 580 | 19 351 | 23 278 | 26 847 |
| Europe/Europa | 2 749 | 4 865 | 6 050 | 7 083 | 7 361 | 8 307 | 9 733 |
| Poland/Polska | 137 | 268 | 549 | 629 | 573 | 659 | 640 |

Source: own study

Źródło: opracowanie własne

of international standards what is presented in Figure 2. The data show that the most widespread standard (obligatory standard) among participants of the food chain is HACCP. The research presents that there are examples of integrations of quality management systems.

It should be emphasized that the increasing use of quality-focused management systems and food safety is designed to enhance the safety of customers while ensuring the development of entities from the agribusiness and the entire agri-food sector.

Summary and conclusions

The article presents common standards for quality management and food safety, which play a significant role in the identification of agri-food entities in the complex food chain. The selection of international standard depends on individual needs, pace in the food chain and the awareness of the organization's personnel. It should be noted that the lack of synergy in *standard-employee (organization) – quality/security* aspects may cause that expected results will not be achieved, because the possession of food safety management system, with unconscious and/or irresponsible employees, is not able to guarantee the safety and quality of raw materials or products in the food chain. Therefore, entities more and more often implement voluntary international standards (e.g. ISO 22000 or GLOBAL G.A.P.) in order to minimize the occurrence of such risks.

The use of international voluntary systems by entities from the agribusiness in the former Middle Pomeranian province is very diverse. It is confirmed by the results from performed research. The data show that the most commonly used international standards are: ISO 9001 (19,86%), ISO 22000 (9,93%), IQMS in accordance with ISO 9001 and ISO 22000 (3,55%), ISO 9001 and HACCP (0,71%) with the HACCP standard (65,95%). The analysis emphasizes the importance of complex quality-focused actions, taking into account the use of obligatory and voluntary standards, which minimize the risk of dangers concerning inappropriate food (products) in the food chain.

In conclusion, the standards of quality management and food safety have become a tool to support agribusiness entities, which aim to achieve quality-focused goals. Voluntary international standards (such as Quality Management Systems in accordance with ISO, GLOBAL G.A.P., etc.) will become a requirement (necessity) and not a desire (option). This may result from increasing consumer awareness (information placed on the labels of products) and quality standards applied by commercial entities, consumer corporations and other entities from the food chain. It should be stressed that the provision of safety and quality in the food chain is not only considered on a local and regional scale, but also a global one. This is because of the globalization of agri-food entities' activity and constantly growing expectations and requirements of clients and consumers. Therefore, international standards should be continuously subjected to actions aimed at the increase of their efficiency and effectiveness whilst increasing the value of the agri-food enterprise.

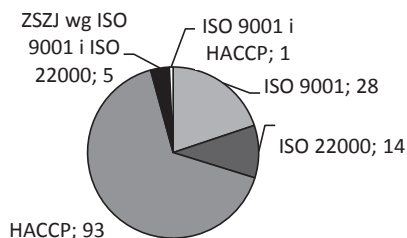


Figure 2. Systems functioning in the examined enterprises

Figure 2. Systemy funkcjonujące w badanych przedsiębiorstwach

Source: own study

Źródło: opracowanie własne

Bibliography

- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Renewed EU Strategy 2011-2014 for Corporate Social Responsibility*, 2011: Brussels, 25.10.2011 COM(2011) 681 final.
- Joint FAO and WHO Food Standards Programme*. 2008: Codex Alimentarius, Codex Alimentarius Commission. Rome, FAO, WHO, 8-10.
- Kielesińska A. 2012. *Aspekty prawne bezpieczeństwa i jakości żywności*, Logistyka 4, 994-1002.
- Kłos Z., Kasprzak J. 2008. *Przydatność ocen ekobilansowych w procesach optymalizacyjnych obiektów technicznych*, Problemy Jakości, 1, 24-28.
- Kołożyn-Krajewska D., Sikora T. 2010. *Zarządzanie bezpieczeństwem żywności. Teoria i praktyka*, Wydawnictwo C.H. Beck, Warszawa, 17, 83-101.
- Konieczny P., Kijowski J. 2005. *Animal Origin Food Preservation And Its Safety Issues*, Pol. J. Food Sci. Nutr., 14/55, SI 1, 21-29.
- Lewandowska A. 2005. *LCA jako element kształtowania ekologicznego wizerunku firmy*. Materiały niepublikowane Akademii Ekonomicznej w Poznaniu, Poznań.
- Malinowska E. 2012. *Jakość i bezpieczeństwo żywności i żywienia w świetle badań jednostek nadzoru*, Zarządzanie i Finanse, no. 3, 71-83.
- Morkis G. 2006. *Stopień wdrożenia GHP*, Żywność. Nauka. Technologia. Jakość, nr 3(48), 129-145.
- Norma PN-ISO 9000:2006. *Systemy zarządzania jakością. Podstawy i terminologia*, PKN, Warszawa.
- Nowicki P., Sikora T. 2012. *Obligatory and voluntary food safety management systems – the up to date review*, 6th International Quality Conference, June 08th, 723-734.
- Olkiewicz M. 2013. *Systemy zarządzania ukierunkowane na jakość w przedsiębiorstwach logistycznych*, [w:] L. Zawadzka, G. Zieliński (red.), *Zarządzanie operacyjne w teorii i praktyce. Systemy, procesy, narzędzia*, Wyd. Politechnika Gdańska, Gdańsk, 92.
- Olson P., Borit M. 2013. *How to define traceability*, Trends Food Sci. Technol., no 29, 2, 12-13.
- Pondel H. 2007. *Wykorzystanie koncepcji ekomarketingu w rynkowej walce o klienta*, Zesz. Nauk. Gnieźnieńskiej Wyższej Szkoły Humanistyczno-Menedżerskiej „Milenium”, nr 1, 45-60.
- Popis M. 2013. *Systemy bezpieczeństwa żywności*, Problemy Jakości, nr 2, 19-25.
- Rozporządzenie (WE) Nr 178/2002 Parlamentu Europejskiego i Rady*, Dz.U. UE, L31/1.
- Salata B. 2012. *Zintegrowane zapewnienie bezpieczeństwa i jakości żywności Global GAP*, CDR w Brwinowie Oddział Radom, Radom, 7-20.
- Sisco C., Blythe Chorn B., Pruzan-Jorgensen P.M. 2010. *Supply Chain Sustainability. A Practical Guide for Continuous Improvement*, UN Global Compact Office and Business for Social Responsibility, 5.
- Ustawa z dnia 25 sierpnia 2006 r. o bezpieczeństwie żywności i żywienia z późn. zm.*, Dz.U. 2006, nr 171, poz. 1225.
- Zalewski R.I. 2004. *Zarządzanie jakością w produkcji żywności*, Akademia Ekonomiczna w Poznaniu, Poznań, 259.
- www.globalgap.org/uk_en/media-events/news/articles
www.globalgap.org/uk/en/search/index.html

Streszczenie

Przedstawiono rozważania dotyczące istoty podejmowanych działań pro jakościowych opartych na międzynarodowych standardach zarządzania jakością i bezpieczeństwem żywności w kompleksowym łańcuchu żywnościowym. Przybliżono istotę oraz specyfikę międzynarodowych standardów. Z przeprowadzonych autorskich badań wynika, że w byłym województwie środkowopomorskim, wśród 141 podmiotów agrobiznesu (niezależnie od wielkości organizacji oraz specyfiki działania) występuje zróżnicowanie stosowania dobrowolnych międzynarodowych standardów mających na celu zapewnienie gwarancji jakości oraz bezpieczeństwa żywności w kompleksowym łańcuchu żywnościowym.

Correspondence address

Dr Marcin Olkiewicz

Koszalin University of Technology

Faculty of Economic Sciences, Department of Management

Kwiatkowskiego Str. 6E; 75-343 Koszalin, Poland

phone +48 606 833 888; e-mail: marcin.olkiewicz@tu.koszalin.pl