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## **SAFETY AND QUALITY OF POLISH FOOD**

Food is a special good. It is special because of its place in the world economy and a set of products setting the latest trends in the economy. Nowadays, more and more attention is paid not only to food supply and availability but also to its quality and adulteration. It results, above all, from the more and more common phenomenon of food adulteration on a global scale. The phenomenon being a consequence of, first of all, liberalization of commodity exchange and development of food trade (Kowalczyk 2009), generally, therefore, a consequence of progressing globalization (Kowalczyk 2014). For these reasons, the problem of food safety and quality becomes an essential topic of consideration both at the national, regional (e.g. European Union - EU) and global (Codex Alimentarius) level.

The aim of this article was to assess the level of quality and food safety in Poland during the last several years. Formation of quality and food safety requires precise control, which is possible thanks to the creation of quality and food safety management systems. These systems concern the control of food at all stages of its production, i.e. from the producer to the consumer.

The analysis showed that it is difficult to assess unequivocally the level of food quality and safety in Poland. The study was based on the analysis of literature on the analyzed subject, including numerous, selected reports and post-inspection reports of various organizations studying the quality and safety of food in Poland.

The level of food safety on the Polish market is good and comparable to other EU countries. However, it is not free from irregularities that may periodically increase. Minimizing these threats is possible, among others, by consistent controls, promotion of participation in voluntary quality systems and high requirements in terms of quality standards.

**Key words:** *quality, food safety, food quality, food fraud.*

Їжа – особливий товар. Він особливий через своє місце у світовій економіці та набір продуктів, що задають новітні тенденції в економіці. Нині все більше уваги приділяється не тільки забезпеченню та доступності їжі, а й її якості та фальсифікації. Це є наслідком, перш за все, все більш поширеного явища фальсифікації харчових продуктів у глобальному масштабі. Явище є наслідком, насамперед, лібералізації товарообміну та розвитку продовольчої торгівлі (Kowalczyk 2009), загалом наслідком прогресуючої глобалізації (Kowalczyk 2014). З цих причин проблема безпечності та якості харчових продуктів стає важливою темою для розгляду як на національному, регіональному (наприклад, Європейський Союз – ЄС), так і на глобальному (Codex Alimentarius) рівні.

Метою цієї статті є оцінка рівня якості та безпеки харчових продуктів у Польщі протягом останніх кількох років. Формування якості та безпеки харчових продуктів потребує чіткого контролю, що можливе завдяки створенню систем управління якістю та безпечністю харчових продуктів. Ці системи стосуються контролю харчових продуктів на всіх етапах їх виробництва, тобто від виробника до споживача.

Аналіз показав, що важко однозначно оцінити рівень якості та безпеки харчових продуктів у Польщі. Дослідження базувалося на аналізі літератури з цієї тематики, включаючи численні вибрані звіти та звіти після інспекцій різних організацій, що вивчають якість та безпеку харчових продуктів у Польщі.

Рівень безпечності харчових продуктів на польському ринку є хорошим і порівняним з іншими країнами ЄС. Однак він не позбавлений нерівностей, які можуть періодично збільшуватися. Мінімізувати ці загрози можна, серед іншого, шляхом послідовного контролю, сприяння участі в добровільних системах якості та високих вимог до стандартів якості.

**Ключові слова:** *якість, безпечність харчових продуктів, якість харчових продуктів, харчові шахрайства.*

## **Introduction**

In the modern world, the concept of quality is becoming more and more important, especially in the area of food and its broadly understood safety. Access to information results in consumers' greater interest in quality-related issues. The problem of food safety and quality is becoming an essential subject of consideration, both for representatives of science and for politicians, representatives of governmental and non-governmental institutions and organizations, both on the national and global level. More and more organizations are engaged in actions aimed at raising consumer awareness. In companies, special departments are created, whose task is not only to control but also to design quality. Confirmation of the company's concern for the quality of its products and services is the use of a quality management system and other systems that guarantee the quality of products (Kowalczyk 2009, Kowalczyk 2014, Kowalczyk and Kwasek 2020; Kozłowska-Burdziak 2019).

Due to the role of food in human life, ensuring food security is undoubtedly one of the most important problems of the modern world (Kozłowska-Burdziak 2019). The pursuit of food quality is an important part of the EU food sector's strategy in the global market to maintain a high level of competitiveness. In order to ensure high food quality, all links of the food chain, from primary production through processing, storage, distribution, sale of food products to consumption, must be under strict supervision aimed at identifying factors (hazards: biological, chemical and physical) that reduce food quality (Kowalczyk and Kwasek 2020).

Lack of ensured food safety poses a risk of unsafe food on the market, understood in the legal aspect as a foodstuff, the consumption of which under normal conditions and in accordance with its intended use may cause negative consequences for human health or life (Kowalczyk and Kwasek 2020).

The article presents the situation of quality and consequently food safety on the Polish market.

### **Research method**

The aim of the study is to determine the main trends in the formation of food security in the economy. Food safety should be understood as three basic dimensions of food safety: physical availability of food, economic availability and its health quality, which is the main component of food safety.

The analysis of control studies on the quality of food products presented in the paper was based on the results of inspections carried out by the State Sanitary Inspectorate (PIS) in 2004-2020 and the Agricultural and Food Quality Inspection (IJHARS) in 2010-2020 as well as on literature studies concerning the subject matter.

### **Quality – definition**

Quality is difficult to define because it is a multidimensional and interdisciplinary concept, it is a term difficult to define unambiguously mainly because of its subjectivity. Problems arising from the different ways of defining quality arise from factors such as:

- quality assessment depends on experience, knowledge, demand for the product,
- the level of awareness of employees and superiors and the degree of implementation of quality concepts in an enterprise,
- the concept of quality is subject to change as a result of the development of humanity and the occurring quality changes (Budol 2008).

The origin of quality goes back to ancient times and derives from the Greek *poiotes*. It was first used by Plato, considering that “the quality of concrete things is the degree of perfection achieved by them”. Aristotle understood quality as the “difference of essence” that, together with nine other categories, makes it possible to divide all concepts into logical groups (time, place, quantity, substance, relation, position, disposition, activity, subjectivity of activity, and quality) (Frąś 2000, Prussak 2006).

Quality in economic terms “is the degree of conformity of the product to the requirements of the recipient, and these in turn are derived from his needs, income and prices” (Oyrzanowski 1969). On the other hand, the marketing approach exposes the market aspect and concerns, interestingly, only services, which in this context are the only object of quality. Quality is the level of consumer satisfaction (meeting or exceeding buyer’s expectations) (Rogozinski, 2000).

From the perspective of the experienter, quality is “the ability of a product to satisfy human needs” (Karaszewski, 2005). The consumer and the producer will perceive quality differently. This is due to their different expectations from a particular product.

The process of quality acceptance in the process of purchasing products is influenced by many factors that are related to functional and non-functional needs. For the user, it will be important to satisfy functional needs, such as comfort of use,

reliability, cost-effectiveness, and non-functional needs, such as image building, satisfaction of aesthetic needs. For the supplier (manufacturer) the product should be competitive, profitable and satisfy the need for technological (Fraś, 2000).

The problem of quality in the market of foodstuffs, requires producers to take such challenges to satisfy the consumer to the best possible extent. Consumers pay more and more attention to the quality of food every year, which is justified because the health and well-being of the population depends on it (Góralczyk 2008).

The responsibility for the quality of the product lies with the food producer, who through the introduction of appropriate quality assurance systems builds trust in individual consumers. At the time of food purchase, the consumer has no way of assessing whether the food he or she has chosen poses a threat to his or her health or life. The consumer is guided only by certain sensory indicators of his choice (Kijowski and Wystoucha 2003). The customer perceives quality through the lens of many factors, which include: utility, quality of workmanship, ease of use, acceptable price, durability and strength, availability over time, after-sales service, acceptable design with additional features, delivery terms, etc. (Karaszewski 2006).

#### **Food quality and safety**

Food is a special kind of good because it satisfies the most basic biological needs of households. Currently, most consumers have access to sufficient food products. Buyers' demands regarding the level of quality and safety are increasing. It is commonly believed that improper food, including the consumption of low-quality food, is the cause of many types of diseases arising both against the background of deficiencies of certain nutrients and their excess in the daily diet (Omieciuch 2016).

Modern consumers value high food quality and take it into account when they buy food products (Zalega 2014). Having confidence in the product and the conviction that its quality is high, they purchase it. Providing consumers with a high level of food quality and safety throughout the food chain "from field to table" should become a priority in the activities of food market operators, because high quality of food products is a major factor in the competitiveness of the food sector. Lack of quality or failure to ensure food safety can lead businesses to significant revenue losses and even bankruptcy (Omieciuch 2016).

Colloquially, food quality is understood as health quality, which depends on the nutrients it contains and the presence of foreign substances in it that may be harmful to human health. In Polish food law, the definition of commercial quality of an agri-food article is still valid. According to the Act on trade quality of agri-food articles of 2000 (Journal of Laws No. 5, item 44) «trade quality means the features of an agri-food article relating to its organoleptic, physicochemical and microbiological properties with regard to production technology, size or weight, as well as the requirements resulting from the manner of production, packaging, presentation and labelling not covered by sanitary, veterinary and phytosanitary regulations». (Gulbicka 2008).

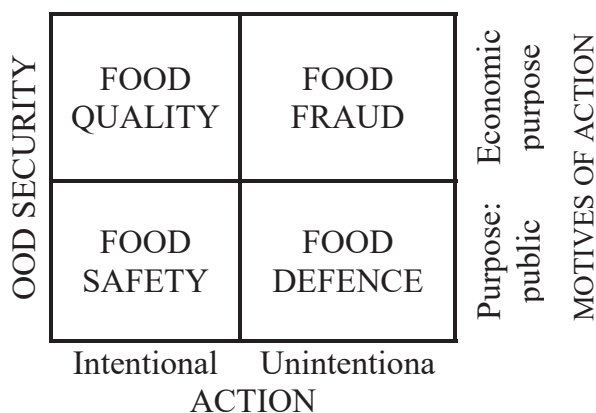
Food health safety is defined by Codex Alimentarius as ensuring that food will not cause harm to the health of the consumer if prepared and/or consumed in accordance with its intended use (Codex Alimentarius, 2003). The Polish Food

and Nutrition Safety Act defines food safety as «the totality of conditions that must be met, concerning in particular: additives and flavourings used, levels of contaminants, pesticide residues, conditions of food irradiation, organoleptic characteristics and actions that must be taken at all stages of food production or marketing – to ensure human health and life» (Journal of Laws, 2006, No. 171).

From the consumer’s point of view, health safety of food is the most important quality feature, therefore the food law (global and European) regulates this issue in detail in order to reassure the consumer that the food he buys meets his expectations in terms of safety. However, the concept of safety should not be limited only to the health safety of food, but should also be seen in the context of public health, nutrition, food and feed quality, and consumer economic security (Kołożyn-Krajewska 2015, Kowalczyk 2014).

What determines the level of quality, not forgetting quality assurance systems (GHP, GMP, HACCP), which are an element of internal quality control, are mainly state legal regulations and institutions that protect food quality standards against their violation in connection with the production and trade of food products (Omiecniuch 2016).

According to the approach developed by Spink and Moyer (2011), food safety and quality are elements of a concept referred to as Food Risk Matrix. This matrix includes food fraud and food protection in addition to the two core elements of food safety and food security (Figure 1). Food quality and safety, according to the authors, is a consequence of «unintentional» activity (unintentional) activities of market actors in the final effects of food products (Spink and Moyer 2011), while food fraud and food security mean taking intentional actions in these areas (to adulterate food or even poison it).



**Figure 1. The Food Risk Matrix**

Source: own study based on Spink, Moyer 2011, Kowalczyk 2014.

In all four components of the Food Risk Matrix, both intentional and unintentional acts can be identified. The former are obviously more prevalent in the area defined as food fraud and food defense, as basically all acts have an intentionally inscribed intentionality of action, but also in the area of food

quality and food safety there are more and more acts that can hardly be qualified as unintentional (Spink and Moyer 2011; Kowalczyk 2014).

### **Level of food quality and food safety in Poland**

The sanitary condition of food and nutrition facilities, materials and products intended to come into contact with food supervised by the authorities of the State Sanitary Inspectorate has been and still is very diverse. It results mainly from the fact that enterprises operating on the market, especially on the food market, constitute a large group of production, service, commercial, transport, collective feeding and public utility facilities (hospitals, nurseries, kindergartens, schools, nursing homes), additionally differentiated by the scale, time and stage of their activities as well as the size of their infrastructure and staff. The market includes both modern and old facilities, as well as small and very large ones (Sanitary State of the Country 2020).

The sanitary facilities on the market consist of a large group of production, service, commercial, transport, mass catering and public utility facilities (hospitals, nurseries, kindergartens, schools, nursing homes), additionally differentiated by scale, time and stage of activity, as well as size of infrastructure and staff. The market includes both modern and old facilities, as well as small and very large ones (Sanitary State of the Country 2020).

The hygienic and sanitary condition of food production and marketing facilities controlled by the State Sanitary Inspection (PIS) has improved significantly. A comparison of the sanitary condition of food and nutrition facilities assessed in the years 2004–2020 is presented in Table 1. Based on the presented figures, it can be concluded that in the last 16 years the percentage of food production and marketing facilities with inadequate sanitary condition has significantly decreased and stabilized at the level of about 2%, proving the validity of the continuous and systematic involvement of the State Sanitary Inspection authorities in enforcing the standards of the current food law in terms of food safety and meeting hygiene and sanitary requirements (Sanitary State of the Country 2020).

*Table 1*

#### **Percentage of industrial facilities in the food and nutrition sector supervised by PIS not meeting sanitary requirements in the years 2004–2020**

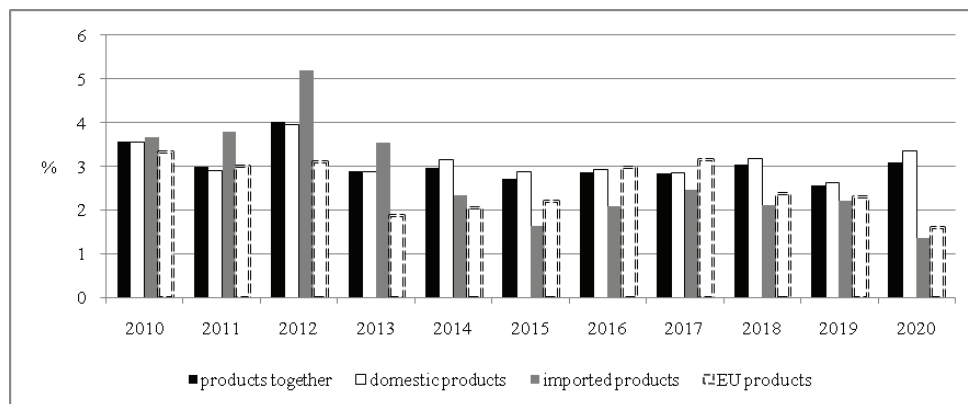
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
%	8,60	2,90	2,30	2,30	2,30	2,20	2,10	2,00	1,70	1,70	1,70	1,90	1,90	1,90	2,00	2,20	2,30

Source: own elaboration based on (Sanitary condition of the country 2020).

In the general consciousness there is a conviction about the high quality of Polish food. This opinion applies to most organic, traditional, regional and local products (Staniak 2014). Their high-quality results from strict standards of their production imposed by legal regulations. Their high quality is shown by studies of various institutions involved in official control of this type of food. In Poland in 2010–2020, about 3–4% of samples are questioned because they do not meet the requirements of food law (Figure 2).



Clearly higher health quality in 2010–2013 is characterized by domestic food products compared to imported products. However, this does not apply to agri-food products purchased in EU countries. Data for 2020 show a deterioration in the health quality of tested domestic food, as many as 3.36% of samples did not comply with the law, while questioned samples of imported food products were 1.36%, of products produced in the EU outside Poland – 1.60%.



**Figure 2. Food samples questioned by the State Sanitary Inspectorate in 2010–2020 (in %)**

Source: own elaboration based on (National Sanitary State 2020).

The microbiological quality of food in Poland has improved significantly, as evidenced by the declining number of food poisonings (Table 2).

Table 2

**Bacterial food poisoning in Poland in 2005-2014**

Year	Bacterial food poisoning – total	Of which caused by			
		<i>Salmonella</i>	<i>Staphylococcus</i>	<i>Botulism</i>	<i>Campylobact</i>
2010	11 464	9 549	217	32	375
2011	10847	8652	283	35	24
2012	10054	8267	147	22	5
2013	9053	7407	128	24	18
2014	9734	8197	68	29	16
2015	9856	8418	98	30	1
2016	10734	9701	37	26	0
2017	10214	9710	54	24	1
2018	10161	9 651	66	22	1
2019	9371	8919	13	15	0
2020	5189	5092	4	9	6

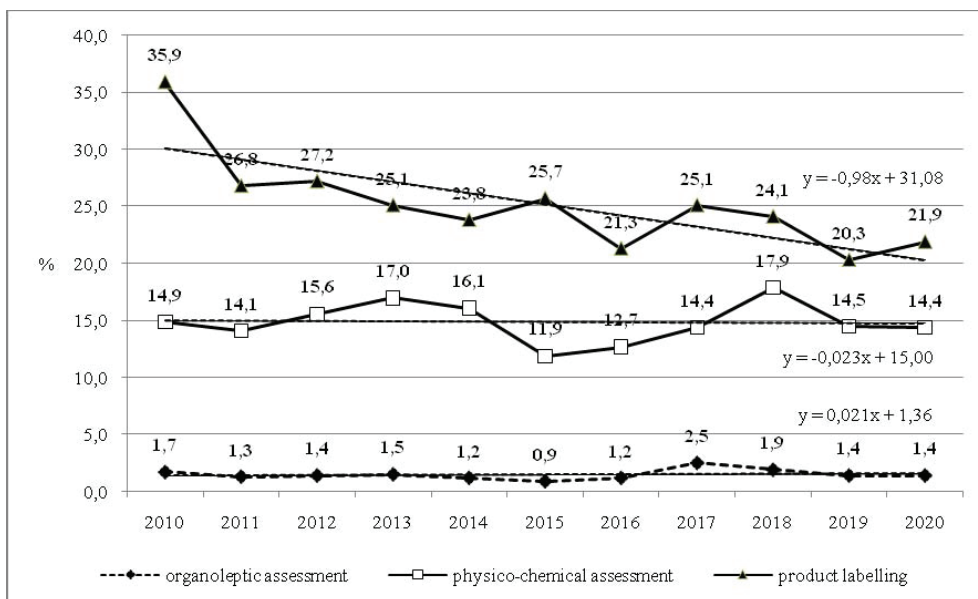
Source: own elaboration based on (Sanitary condition of the country 2020).

A high decrease in the number of infectious disease cases in Poland could be seen especially after the first quarter of the year, i.e., after the beginning of the

COVID-19 epidemic in Poland in March 2020. In connection with the declaration of an epidemic state due to SARS-CoV-2 virus infections in Poland, a number of restrictions and orders were introduced, whose undoubtedly positive side effect was a decrease in the number of cases of other infectious diseases in Poland. The greatest impact on this fact had: wearing protective masks, more frequent washing and disinfection of hands, maintaining a social distance, restrictions on the number of people using public transport or a particular service, limiting social contact, including by closing care facilities, schools, universities, switching employees to the mode of remote working. In 2020, a decrease in the number of cases of almost all notifiable communicable diseases was observed (State of the Nation's Sanitation 2020).

Food quality and the level of its adulteration in the years 2010–2020 will be presented in three basic scopes, i.e.: organoleptic evaluation (taste, smell, color, appearance, product consistency, etc.), physicochemical parameters (e.g. fat, water, protein, carbohydrates, salt, sugar, humidity, volume, acidity) and labelling (Figure 3). The food quality ranges analysed show significant variation in the level of abnormality and trends of change.

The food quality bands analysed show significant variation in terms of level of abnormality and trend of change. In the period 2010–2020 the definitely most favourable situation was in the area of organoleptic properties of food. In the analysed period the level was within the range of 0.9–2.5 % (Figure 3). It is worth noting that organoleptic features were questioned equally in relation to products of vegetable and animal origin.



**Figure 3. The share controlled by IJHARS lots of food with identified irregularities, according to various control areas in the years 2010–2020**

Source: own study based on IJHARS inspection results in the years 2010–2020.



However, a more comprehensive picture of food quality and adulteration gives only a laboratory examination of physicochemical parameters of food. From this point of view the picture of food authenticity on the Polish market is less favourable. During the 11-year period in question, irregularities were found in 12–18% of products (controlled lots). On the basis of the directional coefficient of the linear function ( $a = -0.023$ ) we can observe a stable trend.

Definitely the biggest problem and the most irregularities are found in the process of food labeling. In the analyzed period, the share of incorrectly labeled food ranged from 20.3% in 2019 to 35.9% in 2010. However, a change in the trend can be clearly seen here. If we exclude 2010, in which the level of irregularities in this respect amounted to 35.9% – then in the remaining years of the period in question, the level averaged 24% (Figure 2). Over the entire 11-year period, this resulted in a cumulative decrease in mislabelled food batches of about 0.9 p.p. per year (coefficient  $a = -0.98$ ).

### **Summary**

Food safety and quality are becoming increasingly significant areas of interest for both practice and science. This is a consequence of the globalization of economic processes, including the food chain. Access to sufficient, safe and nutritionally adequate food is crucial for the life and good health of consumers. The primary objective of all food regulations is to protect the health of the consumer. Indeed, the consumer has a right to safe food.

The most important conclusion from the analyses carried out in the article is that it is difficult to assess unequivocally the level of food quality and safety. On the one hand, there is an improvement in the health quality of food, which is the effect of improvement in the sanitary and hygienic condition of facilities. Unfortunately, it does not concern all food products. On the other hand, there are also signals on the market indicating irregularities in commercial quality, which are encountered by consumers, such as so-called food scandals or food counterfeiting. The consequences of this fact have a direct impact on food safety, and thus on consumers' health and life. Therefore, control institutions should systematically monitor the quality of products. The procedure of food adulteration should be eliminated and the entrepreneurs who participate in it should be severely punished.

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