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Concerns about Food Safety among Polish Consumers

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Abstract

Food safety is very important for all of us because we are all food consumers. Food safety influences our health. Consumers are becoming more and more aware of the impact of various factors on their health. They are also increasingly selective and demanding of food because they can choose from a wide range of food products. The paper presents the result of the survey made with CAWI method in Poland in 2020 among 2,000 consumers. The aim of this research was to characterize consumers' perception, attitudes toward various aspects of food safety. Consumers were asked to evaluate the influence of the selected factors/ingredients on their health, such as: residues of antibiotics, residues of pesticides, trans fats, food colorings, food preservatives, environmental pollution, sweeteners, and GMO. The highest level of concerns was expressed for residual antibiotics and hormones 80.4% (harmful and very harmful), pollution from the environment 78.7% (harmful and very harmful), pesticides residues 78.2% (harmful and very harmful), trans fats 69.4% (harmful and very harmful).

The results show that there are many food concerns among consumers. This identification helps to formulate the main fields of information about the various aspects of food safety that should be offered to consumers. The results also provide information to food authorities and food producers about the factors/ingredients that are not accepted by consumers to encourage them to take action to minimize the concerns that arise.

Keywords: food safety, consumer, food concern, food.

JEL Classification: L66, Q02, Q19.

1. Introduction

Food safety is the most important characteristic of food because the lack of food safety influences our health (Badrie et al., 2006; Grunert, 2005; Rohr A. et al., 2005; Bukachi et al., 2021; New Food Magazine, 2021; Bolek, 2020, Franc-Dąbrowska et al., 2021, Jenkins et al., 2021). Food safety is regulated by national and international laws. Consumers are becoming more and more aware of food safety. They know the relationship between the quality and safety of the food consumed and health. Many

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factors influence the quality and safety of food, i.e. the environment, the way of food production, and new technologies. According to many studies, among the main food safety concerns by consumers the following can be mentioned: GMO, food preservatives, various additives, pollution from the environment, residues of pesticides, antibiotics, and hormones. For example, the residues of pesticides in vegetables, cereals, fruits, and nuts were the most reported alarm notification in the RASFF system in 2020 (Report RASFF 2020). RASSF stands for Rapid Alert System for Food and Feed. It was created in 1979. RASFF enables information to be shared efficiently between its members (EU Member State national food safety authorities, Commission, EFSA, ESA, Norway, Liechtenstein, Iceland, and Switzerland). RASFF is a key tool to ensure the flow of information to allow for a swift reaction when risks to public health are detected in the food chain. Consumers do not want to consume ingredients that are harmful, not natural, or unknown. Nowadays in the food market there is a wide variety of food products, so consumers have higher requirements and can choose the products that meet these requirements.

2. Problem Statement

Consumers do not have as much knowledge about food safety as scientists do and perceive some aspects of food safety and quality in a different way. It is worth knowing the main consumers concerns of food to provide them with products they accept, as well as to educate consumers. Food safety is one of many factors that influence their food choice - 50 percent of respondents ranked it in the top three criteria they use in their food-purchase decisions (Eurobarometer survey, 2019). Research on food safety concerns is conducted quite often, which shows the importance of this subject. For example - the consumers participating in the survey Eurobarometer 2019 (Food safety in the EU) were asked how much they are focused on food safety. The results show that consumers are interested in food safety. The majority of the respondents (71%) said either that food safety is among their concerns (43%) or that they take it for granted that the food sold is safe (23%). 63% of Polish consumers admitted that either that food safety is among their concerns (33%) or that they take it for granted that the food sold is safe (30%), 59% of consumers in Romania agreed that either that food safety is among their concerns (39%) or that they take it for granted that the food sold is safe (18%). Based on the 2019 FDA's Food Safety and Nutrition Survey, the major food safety concerns can be identified. Among them are: pesticides in food (1475 answers for "extremely concerned"), antibiotics in food (872 answers for "extremely concerned").

3. Research Questions / Aims of the Research

The aim of the research is to identify the main consumers concerns about the food safety. The research questions are the following:

- 1) Do consumers differentiate the perception of the food concerns? Are they all perceived as harmful or very harmful?
- 2) Which factors/characteristics/ingredients are consumers afraid of most?

- 3) Can we identify some differences in perception of these factors/ingredients, i.e. because of the gender of the age of consumers?

4. Research Methods

The research process consisted of the following stages:

- developing research methodology;
- consultation of the research tool;
- sample selection, implementation of the measuring phase of the survey;
- developing a statistical report;
- developing a final report.

The study was carried out using the CAWI (Computer-Assisted Web Interviewing) technique based on conducting a computer-supervised Internet survey in Poland in 2020. The questionnaire consisted of 23 closed-typed questions. The sample consisted of 2000 people selected taking into account the place of residence (voivodship), gender, and age. Respondents were also characterized in terms of education and material status. The exact distribution of the sample taking into account gender, age, and place of residence is presented below. It reflects the structure of the population of adult Poles residing in the country.

Numeric variables were characterized using basic descriptive statistics: cardinality (N), arithmetic mean (mean), standard deviation (SD), median, lower and upper quartile (IQR), minimum and maximum values (range). Group comparisons were made using Chi-square test. The value of significance (p) was set at 0.05. Calculations were made in the R program (ver. 3.5).

The sample was representative for the whole country. 1049 women and 951 men were interviewed. Among the respondents, 42.4% were the sole decision-makers in the purchase of food products. About 49.7% of the respondents said they make the majority of purchasing decisions for the household. The smallest group (7.9%) were people for whom someone else makes the majority of purchasing decisions. In the survey, respondents also specified their education, size of place of residence, and net income per family member. Most respondents had secondary education (32.2%) and basic vocational education (30.7%). Persons with higher education constituted 26.9%, and the remaining 10.3% of respondents had primary / lower secondary education. Persons with a net income not exceeding PLN 1200 (about 300 €) per person constituted about 19.1% of the total number of respondents. One fifth of the survey participants (20.0%) indicated an income of PLN 1201 to 1600 (301 to 400 €), and respondents declaring income per person within PLN 1601-2000 (401 to 500€) net constituted 20.7% of all respondents. Income in the amount of 2001-2400 (501 to 600 €) was indicated by 19.5% of respondents, and 20.9% of respondents had income per one person exceeding PLN 2400 (+600 €) net. People living in the village accounted for 19.9% of the total, while about 23.0% of the respondents were city dwellers up to 50,000 inhabitants. Approximately 29.0% of the respondents were residents of cities with 50 to 250 thousand inhabitants and 14.7% lived in cities with 250 to 500 thousand inhabitants. The least 13.5% of the respondents lived in cities with more than 500,000 inhabitants (Table 1).

Table 1. Characteristics of the respondents

Voivodship	Woman (age)						Man (age)						Total
	18-29	30-39	40-49	50-59	60-69	+70	18-29	30-39	40-49	50-59	60-69	+70	
Dolnośląskie	12	16	13	11	15	13	12	16	13	11	13	8	153
Kujawsko-pomorskie	10	10	9	9	10	9	10	11	9	8	8	5	108
Lubelskie	10	10	9	9	10	10	10	11	9	8	8	6	110
Lubuskie	4	5	5	4	5	4	5	5	5	4	4	2	52
Łódzkie	11	12	11	10	13	13	11	12	11	9	10	7	130
Małopolskie	16	18	15	13	14	15	16	18	15	13	12	9	174
Mazowieckie	23	29	25	20	25	25	23	28	25	19	20	14	276
Opolskie	4	5	5	4	5	5	4	5	5	4	4	3	53
Podkarpackie	10	11	9	9	9	9	11	11	10	9	8	5	111
Podlaskie	6	6	5	5	5	6	6	6	5	5	4	3	62
Pomorskie	11	12	10	9	10	9	11	12	11	9	9	6	119
Śląskie	19	23	21	20	22	21	20	23	21	19	19	13	241
Świętokrzyskie	6	6	5	5	6	6	6	6	6	5	5	4	66
Warmińsko-mazurskie	7	7	6	6	7	6	7	8	6	6	6	3	75
Wielkopolskie	16	18	16	14	16	14	16	19	16	13	13	8	179
Zachodniopomorskie	7	9	8	7	9	7	8	9	8	7	8	4	91
Total	172	197	172	155	181	172	176	200	175	149	151	100	2000

Source: Own elaboration.

5. Findings

Consumers were asked to assess the impact of the following food safety factors on health, to express their concerns about food safety toward: antibiotics and hormones residues, pesticides residues, environmental pollution, trans fats, sweeteners, GMO, food preservatives, colourings. They indicated the impact by choosing the strength of the negative impact: lack of the impact, little harmful, middle harmful, harmful, very harmful, no opinion. Major consumers concerns regard:

- residual antibiotics and hormones 80.4% (harmful and very harmful);
- pollution from the environment 78.7% (harmful and very harmful);
- pesticides residues 78.2% (harmful and very harmful);
- trans fats 69.4% (harmful and very harmful).

The Polish society is largely homogeneous in its opinions. On the basis of chi² test, it was stated that the answers varied only on two characteristics of the respondents: the age of the respondents and their gender. Young people (18 to 29 years of age) believed more often than other respondents that the above-mentioned factors had little or no harmful effect on health. This was the case of: GMO (22.1% of indications), sweeteners (15.5% of indications), colourings (24.4% of

indications), food preservatives (14.4% of indications), trans fats (9.2% of indications) and residual antibiotics and hormones (8.9% of indications). The answers varied significantly also based on the gender of the respondents. Women more often than men assessed these characteristics as more harmful. The percentage of the indications harmful and very harmful were higher by women than by men.

Food safety concerns may appear at each stage of the food chain, at production stages (unregulated use of pesticides, poor post-harvest handling), during food processing (unregulated use of additives, contaminated water), during transport and sedition, as well as during food preparation (in the local food environment (unhygienic food outlets) or at the consumer level (unhygienic food preparation and storage practices home (Kang'ethe et al., 2020; Iguori et al., 2022)). As the results of the Eurobarometer 2019 survey on food safety show that the three main concerns of food safety are: the misuse of antibiotics, hormones and steroids in farm animals (44%), *pesticide* residues in food (39%), and food additives (36%). These were also among the main concerns reported in the 2010 Eurobarometer on food safety. The FDA's Food Safety and Nutrition Survey 2019 gave some key finding on food safety: Consumers think that people are more likely to get a foodborne illness from food prepared in a restaurant than from food prepared at home – Few respondents (15%) thought it was “very common” for people to get food poisoning because of the way food is prepared at home, compared to 29% who thought it was “very common” to get food poisoning because of the way food is prepared in restaurants. Consumers are more concerned about raw chicken and raw beef than raw vegetables or fruit being contaminated – More respondents thought that raw chicken (93%) and raw beef (66%) were “likely or highly likely” to have germs than raw vegetables (9%) or fruit (6%).

The residues of pesticides are one of the biggest concerns about food safety among consumers according to, for example, the FDA's Food Safety and Nutrition Survey 2019. Glyphosate that is of common use in agriculture and in cities to control weeds, and is a main carcinogenic agent (Araújo et al. 2016; Benbrook 2016). As Carvalho (2017) says, the maximum tolerated limits of residues in foods have been decreasing over the years, although exposure has not decreased sufficiently. Antibiotics are used in food production prophylactically, as well as to treat infections. It is important to control the amount of the antibiotics used to prevent their residues in food. The presence of antibiotics in the food supply has raised concerns about their possible role in increasing antibiotic resistance and hypersensitivity reactions (Landers et al., 2012; Solensky, 2003; Singer et al., 2003; Welsh et al., 2019). Brewer & Rojas (2008) emphasize that concerns about the residues of hormones, antibiotics, or GMO food result in purchase decisions. In their research, they showed that about one-third of consumers would not purchase food because of the abovementioned concerns, and more than 20% have reduced their consumption of some foods because they think they contain genetically modified organisms or are derived from animals treated with hormones or antibiotics.

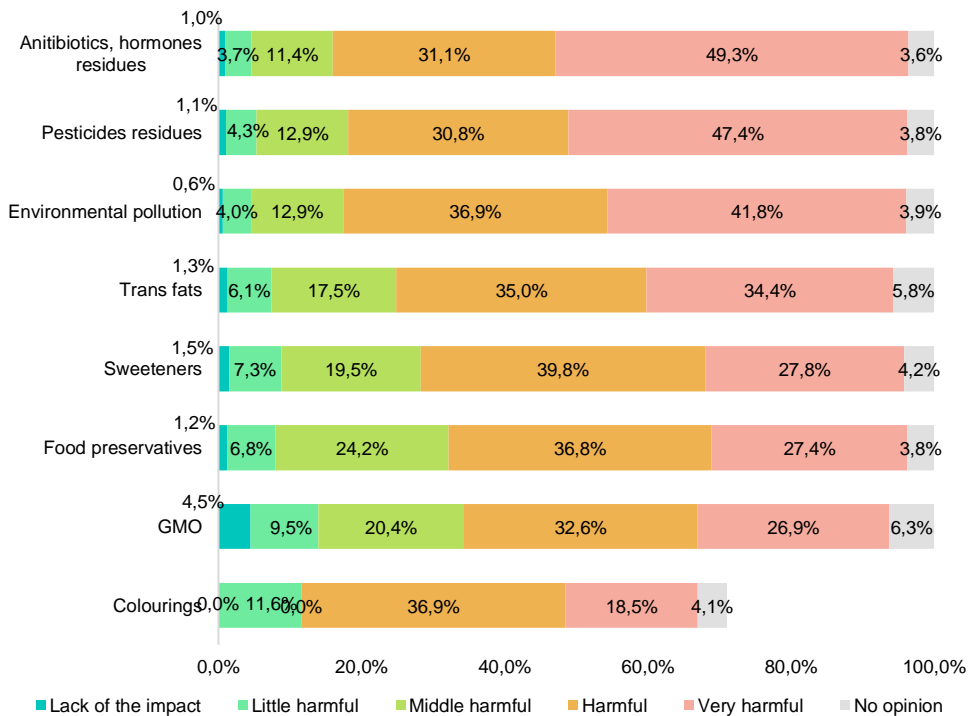
Although three decades have passed since genetically modified organisms were used in food production, this issue is still one of the major consumers concerns

(Palmieri et al., 2020). However, when comparing the results of the Eurobarometer survey in 2019 and in 2010 it can be seen that these concerns decreased (from 66% in 2010 to 27% in 2019). In general, consumers disapprove of the use of GM food. However, American consumers are more accepting of genetically modified foods than European consumers (Le Marrea et al., 2007). In fact, the European consumers are extremely interested in traditional and local food products (Dekhili et al., 2011; Perito et al., 2019). The main concerns about the GMO food are the effects on personal health and environmental impacts (Zilberman et al., 2013; Tas et al., 2015).

Perito et al. (2020) say that in recent years considerable attention has been observed toward natural alternatives to synthetic preservatives. Consumers prefer food with no additives, but if not available, consumers will choose foods containing natural additives over synthetic analogues. They prefer natural products (Devcich et al., 2007; Carcho et al., 2014; Bearth et al., 2014; Coderoni & Perito, 2020).

Oplatowska-Stachowiak & Elliott (2016) characterized consumers' concerns about colourings in food. On the basis of their research, it can be concluded that the most important food safety concerns in the field of food colors are the lack of uniform regulation concerning legal food colors worldwide and the possible link of artificial colors to hyperactive behavior.

Figure 1. Food safety concerns among Polish consumers



Source: Own elaboration.

6. Conclusions

The results of the survey show that consumers differentiate the perception of food concerns – some of them are perceived to be more harmful (i.e. the residues of hormones, antibiotics, pesticides, pollution from the environment) and some less harmful i.e. food colourings. The highest level of concerns was observed with regard to the residues of antibiotics and hormones 80.4% (harmful and very harmful), pollution from the environment 78.7% (harmful and very harmful), and residues of pesticides 78.2% (harmful and very harmful). The answers varied on two socio-economic characteristics – the age and the gender. Young people have the tendency to perceive the risk as lower than others. In this research, young consumers evaluate the negative impact lower than others. On the other hand, women more often expressed higher harmfulness than men. It was shown that food safety has many factors. It is the most important characteristics of food for both consumers and regulatory institutions. Many surveys and reports show that the biggest consumers concerns are residues of substances such as hormones, antibiotics, and pollution from the environment. It shows that a holistic view of the food chain is needed. Consumers are also afraid of food preservatives as a kind of chemical substances in food. Consumers concerns are the subject of various reports what shows the importance of food safety and is the sign of consumers' interest in food safety. The engagement of all food chain actors should remain at least at the same level as it is now. The Food 2030 strategy emphasize the need to look at the food system by three main goals: food safety, food security, and food sustainability.

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