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## FOOD SAFETY BY CONSUMERS IMPORTANCE, ATTITUDE, SELF ASSURING

**Abstract:** *In this paper, food safety was characterized from consumers' point of view. Food safety can be checked in the laboratory, which can be shown, for example, by many certificates and obligatory food safety management systems, but consumers have their own ways to assess the safety of food as well as to make themselves be sure about the safety of food products they buy. The results of a survey made among 2000 consumers are presented. Food safety is an important characteristic of food for consumers as well as the lack of food preservatives and other additives. It was shown that consumers actively participate for assurance food safety they consume. It was indicated as the most popular way to assure food safety is to check information on the food labels. To make sure the product they buy is safe, the usually buy a, the product they know, and product with a certificate.*

**Keywords:** *Food, Food Safety, Consumers*

### 1. Introduction

Food safety is in the centre of interests among EU members and structures. The European Commission's aim is to assure a high level of food safety as well as animal and plant health from farm to fork. The main actions taken to implement Integrated Food Safety Policy in EU are: to assure effective control systems and evaluate compliance with EU standards in the food safety and quality, animal health, animal welfare, animal nutrition and plant health sectors within the EU and in non-EU countries in relation to their exports to the EU; to manage international relations with non-EU countries and international organisations concerning food safety, animal health, animal welfare, animal nutrition and plant health; to manage relations with the European Food Safety Authority (EFSA) and ensure science-based risk management (Food safety, [ec.europa.eu/food](http://ec.europa.eu/food)).

Food safety is regulated by food law. Food products available to consumers have to be safe. Access to safe food is a basic human right (Fung et al., 2018). Every year, more than 600 million people fall ill and 420 000 die from eating food contaminated with bacteria, viruses, parasites, toxins or chemicals (FAO brochure). Consumers assume that the products they buy are safe and this is a normal, correct behaviour. According to Eurobarometer 2019 Food Safety in the EU (This survey was carried out by the Kantar network in the 28 EU Member States between the 9th and 26th of April 2019. Some 27,655 respondents from different social and demographic groups were interviewed face-to-face at home in their mother tongue) and only 5% of respondents did not concern about food safety that shows the importance of this issue. Food safety is a multidisciplinary problem (Griffith, 2006). When we talk about food safety, we should consider: human behaviour, food processing and legislation, management system and organizational

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culture and types of food hazards. Food safety is defined by the World Health Organization as the assurance that food will not cause harm to the consumer when it is prepared and eaten according to its intended use (Bertolatti & Theobald, 2019). Food safety can be characterized as the lack of food hazards. In a narrow sense, food safety is the opposite of food risk – the probability of not getting ill after consumption a certain food. In the broad sense – nutritional quality, concerns about the properties of unknown food (Scarpato et. al, 2017). Authors also say that food safety has become important characteristics while choosing food products as a result of several recent food scares. Food safety is a credence attribute what means that it cannot be verified by consumers both after and before purchase (Stefani & Henson, 2001). In the Regulation (EC) No 178/2002 (Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety) food hazard is defined as a biological, chemical or physical agent in, or condition of, food or feed with the potential to cause an adverse health effect. The basic groups of food hazards are: biological, chemical and physical. Food safety addresses food-borne illness and covers the handling, preparation and storage of food (Walls et. al., 2019). Food actors are obliged to implement GHP, GMP, HACCP to assure food safety in the whole food chain from farm to fork. Consumers also play a role in food safety and quality assurance by their behaviour during and after purchasing food by appropriate food storing, hygiene etc. Consumers may take actions to check the safety of the food they purchase. They can check the best before date/use by date, smell, look the specific colour, read the ingredients list. They have their own way to make sure the food they buy is safe. It is believed that people in different countries in Europe pay more attention to the quality of food and others to its safety. Such a distinction can be

made between the inhabitants of Northern and Central Europe and Southern Europe and the countries of the Mediterranean Basin. For inhabitants of the northern part (i.e. Germany, Scandinavia, Great Britain), food safety and ethical aspects (i.e. treatment of animals) come first. For the inhabitants of Southern Europe (i.e. Spain, Italy, Greece, France), the issues of food quality and the pleasure of food are the most important (Rijswijk, 2008).

According to Järvelä et al. (2006), we can distinguish 8 strategies used by the consumer to ensure the quality and safety of the food they buy:

- 1) Avoidance - the consumer, guided by his own judgment, does not buy certain products, believing that they are not healthy, it is usually associated with possible chemical hazards, e.g. consumers avoid eating liver, foods with additives. This attitude usually occurs when the consumer does not like the product or when an alternative product exists.
- 2) Liking - a strategy opposite to avoidance, the consumer buys products that he enjoys and assigns health properties to them, eg choose low-fat products, organic food, native food.
- 3) Vigilance - the consumer does not trust that all stages in the food chain have been carried out correctly, for example checks the temperature in freezers when buying, the cleanliness of the place of sale, the use-by date. The consumer feels jointly responsible for the quality and safety of food.
- 4) Active consumer - such a consumer believes that everyone fulfills their obligations to ensure adequate quality and safety of food, including the obligation to do so. He looks for information about the product, takes care to ensure appropriate conditions for storing food at home and preparing it, scrupulously reads

information on the labels. These types of consumers are primarily concerned about microbiological hazards in food.

- 5) Moderation and variety - consumers take care of a healthy lifestyle and a varied diet in order to ensure adequate nutritional value and limit the consumption of harmful ingredients, based on their own experience and expert recommendations.
- 6) Common sense - often related to the above strategy, when choosing food, the consumer is guided by his own knowledge and experience as well as the opinions of people close to him. The food he considers unhealthy he rarely eats - the news about the risk of eating a given food is confronted with the frequency of eating it and the amount of unhealthy ingredient.
- 7) Single criterion - guided by one selected criterion, eg price, product origin, brand.
- 8) Indifference - assumes that the food available to the consumer must and is safe, therefore it does not take this issue into account and is guided by its own preferences.

Ergönül (2013) emphasize the meaning of perception the food safety by consumers. In order to make a complete food safety definition, consumers' behaviour and attitudes toward safe food should be considered.

For consumers best before date or use by date that is shown on food label is an important sign of food safety and quality. The obligatory information on food labels are regulated by law (Regulation (EU) No 1169/2011). In this regulation the mandatory information on food labels are described.

It is widely known that attitudes have a strong influence on consumer behaviour. They are also important variables that can explain the models describing consumer behaviour. The main characteristics/aspects of the attitude

are: predisposition to react to an object, not an actual behavior towards that object; permanence over time and time and pressure is needed to change it; consequences in behaviour, associated with feelings towards an object (Churchill, 2002).

Trust in food safety and quality plays an important role in the food market. Lack of trust in food chain actors results in a declined confidence of food choices among consumers. Consumers represents a various level of trust towards various food chain actors, i.e. farmers, producers, retailers etc. Demographic factors such as: gender, income, education level and social class influence the level of trust in food chain actors. Among the determinants of trust the following can be mentioned: social trust, cultural and institutional differences between countries, demographic. Consumer trust in the food system is built up by the beliefs about the trustworthiness of actors (competence, care, openness) and the overall trust in actors – farmers, manufacturers, retailers, authorities (Macready et al., 2020).

The objective of this study is to collect information about food safety, describe consumers' behaviour, attitudes towards food safety as well as to show the importance of food safety from various perspectives.

## **2. Material and Method**

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 was built 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 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 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 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 respondents lived in cities with over 500,000 inhabitants (Table 1).

### **3. Results**

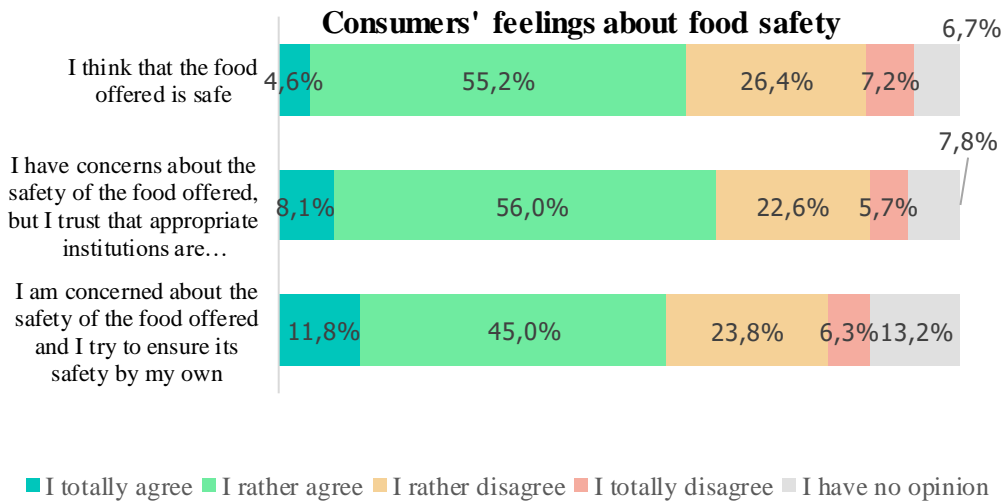
To assess food safety some measures can be made but on the other hand there are the feelings about food safety that can be subjective. In this survey respondents were asked to specify their feelings about food safety. They could choose between three statements (Figure 1):

- 1) I think that the food offered is safe,
- 2) I have concerns about the safety of food offered but I trust that appropriate institutions are supervising it,
- 3) I am concerned about the safety of the food offered and I try to ensure its safety by my own.

About 59.8% of respondents agreed with the statement that the food offered was safe (4.6% of the answers "I totally agree", 55.2% of the answers "I rather agree"). At the same time, 64.1% of respondents admitted that they were concerned about the safety of food offered, but they trust that it is supervised by appropriate services. With the statement: "I have concerns about the safety of food offered and I try to care for its safety" agreed a total of 56.8% of respondents. The information discussed is presented in the figure below. Statistical analysis (Pearson's Chi-squared test) showed that women more often than men agreed (60.2%) with the statement "I have concerns about the safety of food offered, but I trust that appropriate institutions are supervising it". A similar trend was observed in the case of the statement: "I have concerns about the safety of the food offered and I try to ensure its safety by my own" - 48.4% of women surveyed answered (in the group of men the percentage of answers "rather I agree" amounted to 41.1%).

**Table 1.** Description of respondents. Source: own elaboration

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



**Figure 1.** Consumers feelings about food safety. Source: own elaboration.

Consumers participating in the survey were asked how they can self assure higher food safety. They chose between the following answers (Figure 2):

- 1) I check best before date/use by date
- 2) I pay attention in stores to the temperature in freezers and refrigerators,
- 3) I pay attention how long after opening the product is suitable for

consumption,  
 4) I store food in refrigerators as recommended - various products on shelves depending on the recommended storage temperature, and indicated frequency on actions taken. The vast majority of respondents when shopping for foodstuffs checked the best before date (82.2% of answers "always" and "often"). Approximately 67.2% of respondents used to check how long after opening the product was suitable for consumption, and 65.0% stored products on shelves in the refrigerator in accordance with the manufacturer's

instructions. The smallest percentage of people admitted that they always or often check the temperature in freezers or refrigerators - 29.6% of respondents provided such answers. On the basis of Pearson's Chi-squared test it can be said that women more often declared that they always check the best-before date (60.6%) and always pay attention to how long after opening the product can be consumed (35.1%). On the other hand, sole purchasing decision makers more often than other respondents declared that they always check the temperature in freezers and refrigerators.

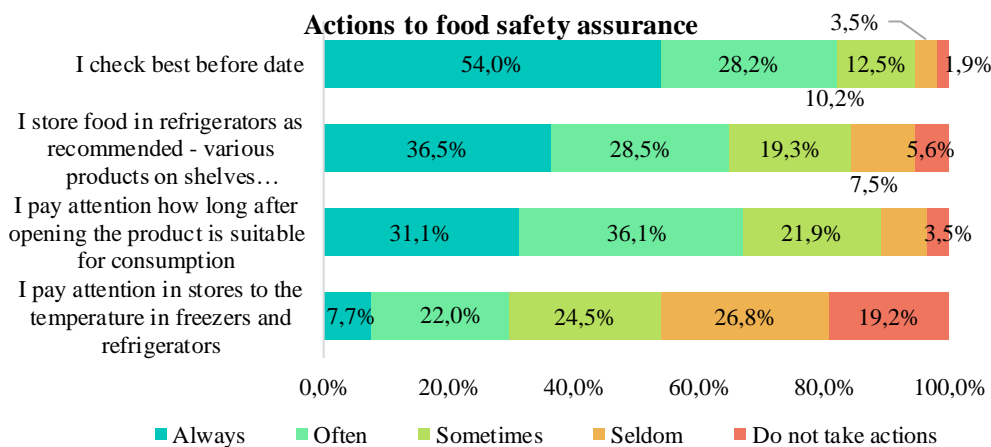


Figure 2. Actions taken by consumers to assure food safety. Source: own elaboration

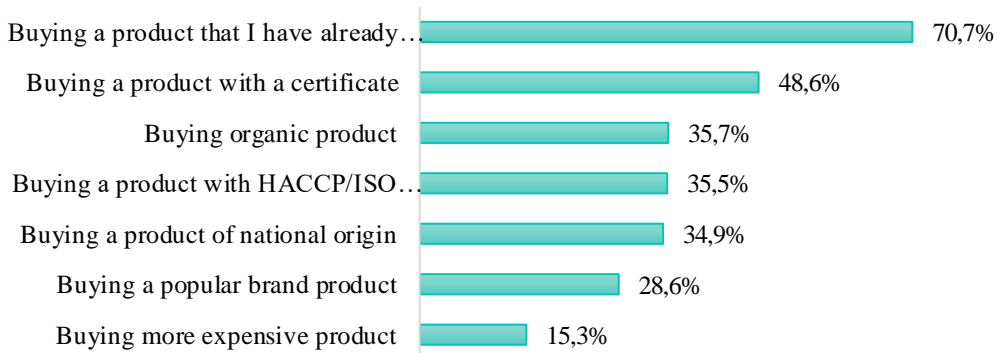
In the next question respondents were asked about the ways to increase food safety/ to make themselves to be sure about the safety of food products. They indicated from the given answers what increases their confidence if food safety such as (Figure 3).

For most respondents, choosing a product they bought before increased the belief that it was safe food (70.7% of responses). Certified products were a guarantee of safe food for 48.6% of those surveyed, and 35.7% of safety guarantees increased the purchase of organic food.

Information on production in accordance with the requirements of HACCP or ISO 22000 was a certainty for the safety of the items bought for 35.5% of respondents. For 34.9% they thought that products made in Poland (national origin) are safe.

Women more often than men indicated: buying certified product (58.3%) and buying organic product (40.0%) as factors increasing confidence that the products, they buy are safe. Men more often considered products of known brands to be safer (33.4%).

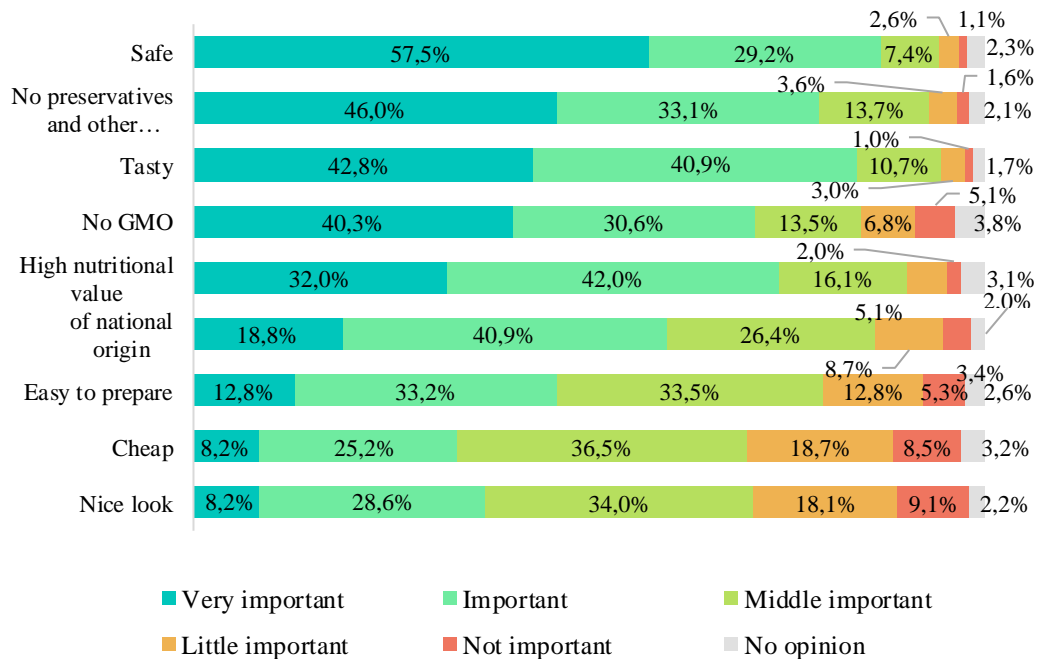
### Characteristics that make the food safe



**Figure 3.** Characteristics that make the food safe by consumers. Source: own elaboration

The answers show that food safety is the most important feature of respondents - 57.5% indicated the answer "very important" and 29.2% "important". Lack of preservatives and additives is a very important feature for 46.0% of respondents, and taste for 42.8% of the total. For around 40.3% of respondents,

they pointed out the lack of GMO ingredients, and 32.0% indicated high nutrient nutrition. The least importance was given to attractive prices and a nice appearance - both aspects of food were very important for 8.2% of respondents (Figure 4).



**Figure 4.** Importance of selected characteristics of food products. Source: own elaboration

Analysis of the results showed statistically significant differences in the answers to this question among men and women. Food features such as: safe, no preservatives and

other additives, no GMOs, high nutritional values and of national origin were more often indicated as "very important" in the group of women (Table 2).

**Table 2.** The importance of selected food characteristics by man and women. Source: own elaboration

Important characteristics for consumers	Percentage of answers „very important”		The difference in points rates
	Woman	Man	
Safe	63.3%	51.1%	12.2%
No preservatives and other food additives	52.0%	39.2%	12.8%
No GMO	44.3%	35.9%	8.4%
High nutritional value	35.7%	27.8%	7.9%
Of national origin	21.7%	15.5%	6.2%

#### 4. Discussion

Many authors emphasize the importance of food safety for consumers (Bolek, 2020; Nesbitt et al., 2014; Sutherland et al., 2020; Scarpato, 2017). Yeung and Yee (2012) agreed that food safety is important for consumer food choice but it also can have a negative effect on the food market due to concern for the foodsafety risk issue. Food safety and quality have been of great interest and concern in recent years (Spizziri & Crillo (eds.), 2017). Both Eurobarometer reports in 2010 and 2019 show the high interest in food safety among consumers. The role and importance of food safety has been increasing because consumers are more and more aware of the influence of food on their health. In general consumers perceived food as safe but they have some concerns and doubts such as GM foods, residues of hormones and antibiotics, chemical substances in food etc. As Ventura-Lucas (2004) showed his research food label is an important source of information about food safety. Food packaging labels can help consumers to trust the safety and quality of food. To evaluate food safety consumers, look at ingredients of food and certificates. Danilola et al. (2017) showed in their research that labels are the fifth most trusted source of information on food after doctors, family, friends and

colleagues, television and the internet. Britwum and Yiannaka (2019) concluded in their research that food labels have gradually evolved from simply conveying nutritional information to communicating the presence of desirable or the absence of undesirable food attributes and/or production technologies. Moreover, consumers are concerned about and are willing to pay price premiums for healthy, safe, and superior quality foods (Loureiro and McCluskey, 2000). The type of information, the design and the wording used on food labels are controlled by food law. European Union regulates the nutrition and healthy claims under Regulation (EC) No 1169/2011. The rules of the Regulation apply to nutrition claims (such as "low fat", "high fibre") and to health claims. The objective of those rules is to ensure that any claim made on a food's labelling, presentation or advertising in the European Union is clear, accurate and based on scientific evidence.

The survey of 5,000 consumers by Deloitte Consulting LLP showed that food safety is important for consumers. The main food safety concerns are:

- 51 percent want “clear and accurate” labeling;
- 47 percent want clear information on ingredients and sourcing;



- 42 percent want fewer overall ingredients, no “artificial” ingredients and less processing; and
- 41 percent want to know the nutritional content of foods.

The main consumers concern about food safety issues are (one thousand interviews were conducted among adults ages 18+ from July 10 to July 13, 2020, International Food Information Council; Food and Health Survey 2020):

- Food becoming contaminated
- Food poisoning or foodborne illness
- Meat is cooked to a safe internal temperature
- Making sure food is cooked according to directions
- The presence of allergens
- The amount of information provided about ingredients.

Research made by the Kerry company showed that during the COVID-19 pandemic the meaning of food safety among consumers has been higher than ever – more than 60 % of consumers increased their focus on food safety. The pandemic resulted in the feeling of vulnerability what increased the interest of the safety of food they consume (2021). In general, consumer started to pay greater attention to safety in various aspects of their life.

Familiarity with food that can be i.e., shown by buying the food product we know as the way to make ourselves be sure the food is safe is also about the trust. Consumer trust that the food product they already known is safe, safer than the unknown product. Trust in food’ has a decisive influence on whether a consumer will continue to use a certain product (Nygard & Storstad, 2002). The range of factors that build consumer trust in food is wide. These factors can be listed as: food attribute claims, food certifications, country and region of origin, food traceability information, food chain actors (farmers, producers, retailers), governance agencies and third-party institutions, advocacy groups and the mass media. These factors influence consumer trust

in two ways - a direct way at the product level by labels and indirectly through actors in the food system (Wu, 2021). If a consumer buys a product for the first time, he is very likely to trust external attributes, e.g. information on the packaging about certificates, brand, country of origin. He does not know the product, so he is largely guided by the information on the packaging. On the other hand, if he has consumed a product at least once, he is guided primarily by his own experience and opinion in his collective choices.

Many authors write about country-of-origin effect what means that consumers differentiate between products from different countries (Agrawal & Kamakura (1999), Verlegh et al. (2005), Schnettler et al. (2008)). Country of origin has an impact on product evaluation by consumers. 8 in 10 consumers in UK check where their food has come from (survey made by Elementar UK, 2017).

Consumers often as it was shown choose a product, they know to make themselves be sure it is safe or buy a product of a particular brand. Consumers trust their own experience; therefore, the repeatability of food quality is very important. The brand image can be a sign of food safety as well as the trust in food safety and quality. It was shown by Manning (2007) that through the brand of the food product consumers can expect the quality of food, safety of food, benefits, high reputation of a product. Consumers combine the brand image with the quality and safety of a food product, therefore, if there is a hazard to food, it is very difficult to rebuild consumer confidence in the brand. It is a long-term program that requires commitment and large financial outlays.

Consumers evaluate the food safety from the perspective of lack of substances they do not accept. One of them are food additives. It is said that fear of food additives comes from chemophobia that sourced from a lack of understanding the role of additives (Borda et al., 2021). Consumers may reject food that

contains food additives and perceive these products as less safe. On the other hand, consumers understand the role of the food preservatives to make food be fresh for longer time as well as to assure its safety. This doesn't mean the fact that in general food preservatives are not accepted to majority of consumers. Nowadays there is a trend to avoid the usage of food preservatives and replace them with natural ingredients of the same function. Actors in the food chain are responsible for food safety but consumers also have the influence on the safety of food they purchase and consume. Consumers can directly impact the food safety in two areas: in home environment where they store and prepare food and during food purchase. The best practices during purchasing food products to ensure they are safe can be listed as: not to buy dented, swollen or leaking cans or containers, not to buy product if the packaging is damaged, not to buy cracked or dirty eggs, check the temperature in refrigerators and freezers and not to buy chilled or frozen food left out of the refrigerators or freezers, no to buy ready-to-eat foods left uncovered on counters, hot food, like takeaways, which are not steaming hot; trust your perception if the product looks differently do not buy it.

Food taste is an important driver in food choice. It is said that taste preferences might play a different role during the life span. In this way children's food choices seem to be stronger related to basic taste preferences, than adults' food choices. Food taste

preferences can be formed by external environment, i.e., trends, friends, aiming at healthy diet. Consumers that are more focused on taste than healthy diet, more often in general make an unhealthy food choice. They prefer salt taste, fat and more often consumer fast foods (Liem & Russel, 2019). Food taste can also be a sign of lack of food safety if the taste is changed, not characteristic for the food product. The same situation can take place with the food colour. The change of the food colour may show the lack of food safety

## **5. Conclusion**

It was shown that food safety from the perspective of consumers is a complex issue as well as the food chain is built of many various members, i.e.: farmers, distributors, producers, retailers etc. Consumers also have the influence on food safety by their behaviour and knowledge. Food safety is the most important characteristic of food for consumers. As it was shown not only food scientists concern food safety but consumers also do. In the literature of food safety often the lay-expert discrepancy is shown. In case of food safety importance this rule seems not to take place. Both for scientist and consumers food safety is the most important characteristic of food. A typical food consumer usually has lower knowledge about food than professionals have but takes actions to increase self confidence on food safety - most often by purchasing a product that bought before and also purchasing a product with a certificate. The most popular behaviour in terms of making themselves sure of safety of products they buy is to check best before date. Consumers admitted that they have some concerns about food safety but they trust the institution responsible for food quality and safety. As it was shown many consumers have concerns about the safety of food but trust in the role and responsibility of the food safety institutions. Trust plays an important role while food purchasing because we cannot check all of the characteristics of food products we buy that is why trust is necessary.

It can be concluded that food safety is very important for consumers. In recent years the role of safety in general has increased in various aspects of our lives. The trend of paying attention to food safety as well as the increased awareness among consumers about the meaning of food safety are the positive aspects and show growing involvement of consumers in consuming safe food. Consumers are becoming more and more concerned with food issues and are aware of their choices. They also pay attention to the information on the food packaging, looking

for either information that is to confirm their judgments about the quality and safety of food (e.g. country of origin, brand, certificate) or information that they do not want to find in food (e.g. food additives).

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