



FOOD SAFETY FROM A CONSUMERS' POINT OF VIEW: FOOD QUALITY

Eudmila Nagyová, Jozef Golian, Andrej Géci, Jozef Palkovič, Jozef Čapla, Zdenka Kádeková

ABSTRACT

Food safety is a topic that is currently very much and often discussed. This may be a debate among political representatives, representatives of the food industry, but also among consumers, ie. general public. The issue of food safety and quality is very important in view of the growing globalization of economy, whose mission is to encourage food businesses to improve the production process as a whole and competitiveness. As in every sector, the food market faces many problems arising from market opening, business environment diversity or non-compliance with legislative requirements. The effects of these market imperfections are ultimately borne by the consumer. It is, therefore, appropriate to ensure that consumers are adequately informed about the food they consume. Food production is carried out according to European and world standards. A Slovak customer purchases food imported from abroad. This fact can be caused by the pricing of individual foods but also by the lack of Slovak producers. Foreign competition liquidates the quality Slovak producers. The principle of customers should be to support the economy of the state and to buy domestic food. The submitted document deals with issues of food safety, control and quality of food. The aim of the work was to examine the attitudes of consumers to food safety based on the acquired knowledge and research results, to identify their interest in food safety. It also involved identifying global food safety issues and analyzing consumers' views on the problem under consideration and its impact on their purchasing behavior. Primary data was obtained from a survey that was performed on a sample of 478 respondents. Based on the survey, it was confirmed that 85% of respondents perceive the different quality of the food sold on the Slovak market. Nearly two-thirds of the respondents said they were paying attention to the quality of the groceries. More than half of respondents expressed satisfaction with hygienic sales conditions. Almost 80% think that high-quality food is commonly available. Statistical testing has confirmed the significantly lower quality of food produced abroad. Other assumptions were formulated for more detailed analysis and their relationships were verified by using the statistical methods (Friedman Test, Chi-Square Test of Independence, Wilcoxon Signed-Rank Test).

Keywords: food; food safety; food quality; food risk; consumer

INTRODUCTION

The basic need of every person is food intake, and therefore, this term is included in personal security, which also includes food safety and food control. **Act 215/2004 Coll. Section 6 on the Protection of Classified Information and the Amendment of Certain Laws** defines personnel security as a system of measures relating to the selection, identification and control of persons who may, to a certain extent, be informed of classified information. Food control is an integral part of today's rapidly evolving world (Suchánek, Richter, Králová, 2017). Recently, the consumer is increasingly confronted with the term quality. Through the quality is determined and selected the food that customers consume. If the basic hygiene rules are not observed, either in production, storage, transport or in the actual purchase and processing

of food, their non-compliance can lead to very serious consequences for human health (Zhang et al., 2017; Yu et al., 2017).

Food quality is associated with a set of all the important features that are sensory sensed but also with features that the consumer does not need to register at all before consuming or consuming food. Individual attributes of food quality are laid down by legislation. However, a number of other properties and criteria of food quality are specified by the manufacturer and are given in the specification of the food product concerned. Food safety criteria are the most important subgroup for food quality assessment. However, the quality and safety of food are two terms that can not be confused (Trade Union of the Slovak Republic).

Foods are a set of substances needed to grow, restore and maintain the body's functions. Regular feeding is very important for the population because it supplies the organism with all necessary nutrients (Michealidou and Hassan, 2007).

Food consumption pertains to all inhabitants, reflecting the socio - economic conditions of people's lives, traditions, culture and overall living standards. It is important to direct the attitudes of man and the whole society towards the rational consumption and nutrition of individual types of food, in order to make food production and consumption more efficient and to reduce the threat to the health of the population (Holienčinová, 2013, Gorris, 2005). One of the most important food quality requirements is their safety, i. food should not endanger human health (Shang and Tonsor, 2017; Stecova and Popelka, 2005). Safety, in this case, means the health and hygiene of food safety (Nijage et al., 2018; Golian and Sokol, 2005). Hygienic harmlessness is understood to mean a food whose production is adhered to and approved, and hygiene standards, that is, that it is suitable for human consumption (Kind et al., 2017; Pavelková and Bobková, 2008). Healthy food refers to foods that do not contain pathogens. Food substances should not exceed a dose that could cause disease in humans (Boeck et al., 2018). Conversely, pathogenic foods are those that contain inappropriate chemical composition, inappropriate properties (debilitation, unknown origin) and also contain poisonous and harmful substances. Such foods pose a tremendous risk to human health (Trienekens and Zuurbier, 2008; Shi and Zhu, 2009). Food shall not be placed on the market unless it is safe for health. Health security is also very closely related to the concept of food quality (Marotta, Simeone and Nazzaro, 2014). Quality is nowadays very often inflated. This was due in particular to a different quality of food of the same brand. These foods are exported from abroad all over the world. The Food Code of the Slovak Republic defines quality as a summary of certain binding properties and product features that are primarily intended to meet the specific needs of individual consumers. In the food market, we are experiencing greater sensitivity of consumers to the required quality of products (Kubicová and Kádeková, 2012). However, quality is a much broader term that includes other qualitative criteria and characters (Pable, Lu and Auerbach, 2010). These features can be determined by the manufacturer himself. According to Loureiro and Umberger (2007), the quality is a sum of properties, characteristics and features that contribute to a greater degree of satisfaction of identified or anticipated needs (Grunert and Aachmann, 2016). Quality includes the composition of foods that are determined by their nutritional value (Chrysochou, Krystallis and Giraud, 2012). These benefits affect the overall value of the product that has become the basis for determining the market price as well as the sensory characteristics of the food in question. We can say that the better the composition of food, the higher the price (Rompay, Deterink and Fenko, 2016). The relationship of quality and price is then reflected in a marketing strategy that the manufacturer or seller has to identify clearly (Kubicová and Kádeková, 2017).

Another level of quality characterizes the already mentioned sensory properties of foods that contribute to re-purchase (Waldman and Kerr, 2018). Sensory properties serve to enable the consumer to process perceived information (Duncan, 2011; Loutfi et al., 2015). Consumers choose and evaluate the foods they consume through these features (Krishna, 2013; Géci, Nagyová and Rybanská, 2017). The evaluation is based on the use of individual sensory organs (McFadden and Huffman, 2017). Sensory organs mean five basic senses: vision, smell, taste, hearing and touch (Lindstrom, 2006). The term consumer includes everyone who buys products or services for their needs (Lee and Yun, 2015). Its behavior may be affected by a number of factors such as: a mark, price or packaging (Magnier, Schoormans and Mugge, 2016; Feldmann and Hamm, 2015). Consumer behavior is characterized as a course of behavior of organizations, groups and individuals in the market of products and services (Kozelová et al., 2011). Where the main goal is to meet the needs of high-quality, hygienic and health-friendly products (Nagyová, Berčík and Horská, 2014). The market is showing more and more often that the customer becomes demanding and is willing to pay a higher price for quality food (Kubicová and Kádeková, 2011).

MATERIAL AND METHODOLOGY

The aim of the paper is to examine the attitudes of consumers to the health safety of food produced and sold in the Slovak market. In order to meet the stated objective, a questionnaire survey was conducted in the territory of the Slovak Republic in the months October - December 2017, involving 478 respondents of different age categories. Secondary information has become available to the public as well as scientific and professional publications of domestic and foreign authors dealing with the issues addressed. Questions in the questionnaire were divided into two groups - nine classification questions and 12 questions related to the food quality. Potential respondents received a questionnaire in a paper form. After completing, all correctly filled questionnaires were transformed into the Google Forms internet application.

Primarily, the information obtained through the questionnaire survey was processed by statistical methods – Friedman test which is a non-parametric alternative to the repeated measures ANOVA where the assumption of normality is not acceptable. Usually it is used in case of ordinal dependent variable. This occurs especially in case of questioner survey, when each respondent assesses more than two products using the same scale. In case of Friedman test applications should be met following conditions: One group that is measured on three or more different occasions – group is a random sample from the population, dependent variable should be measured at the ordinal or continuous level and samples do not need to be normally distributed. The non-parametric post-hoc test called Nemenyi test which is based on the Kruskal-Wallis method of ranking in a one-way classification and Chi-Square test of Independence to investigate relationship between categorical variables.

The established hypotheses were verified by appropriate mathematical – statistical methods that enabled the hypothesis to be confirmed or rejected.

The probability level is determined on the base of alpha ($\alpha = 0.05$), which is compared with the significance level (p -value). Based on alpha (α), we can evaluate the hypothesis with the p -value comparison. If p -value is

lower than alpha (α), H_0 will be rejected. If p -value is higher than alpha (α), H_0 will be accepted.

Table 1: Characteristics of Respondents

Category of Respondents	%
Male	41
Female	59
Place of Residence	%
City	47
Village	53
Age Structure	%
Less than 20 years	6
21 – 30 years	46
31 – 40 years	16
41 – 50 years	17
51 – 60 years	10
61 years and more	5
Net Family Income	%
Up to 330 €	8
331 – 500 €	9
501 – 660 €	21
661 – 830 €	22
831 € and more	40

Scientific Hypothesis

Hypothesis No. 1: We assume, there does not exist a difference between the quality of food produced abroad and in Slovakia.

Hypothesis No. 2: We assume, there does not exist a difference between the health safety of food produced abroad and in Slovakia.

Hypothesis No. 3: We assume, there does not exist a difference between the quality and safety of food produced in the Slovak market.

Hypothesis No. 4: We assume, there does not exist a difference between health food safety control and food quality control.

RESULTS AND DISCUSSION

Of the total 478 respondents, the majority was represented by women (58%). The most respondents (46%) were aged 21 to 30 years, followed by the interval

from 41 to 50 years (17%) and further from 31 to 40 years (16%).

The highest achieved education was higher education, which was reported by up to 47% of the respondents. On the question related to the residence of respondents, 47% of them said they live in the village, remaining 53% of the respondents live in the city.

The monthly family income of the respondents ranged from 300 € to more than 831 € (**Figure 1**). The obtained results were anticipated because the survey was aimed at the general public and all age groups. As could be seen in **Figure 1**, the most respondents reported a monthly family income 831 € and more. Another, the most-ranked group, was an income from 661 € to 830 € (22%). The smallest income range - up to 330 € - was marked by only 8% of the respondents.

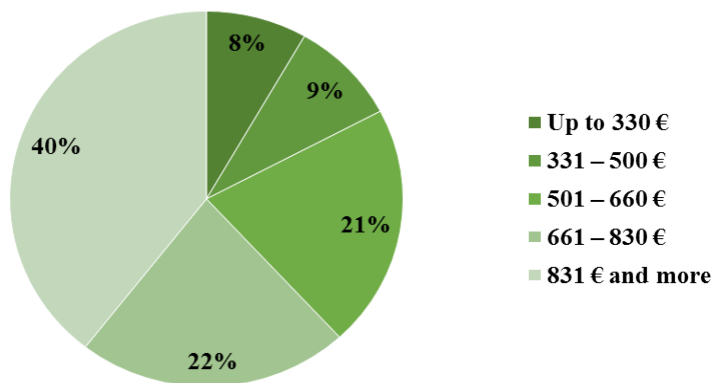


Figure 1 Monthly Family Income.

Responding to the first question in the questionnaire, the respondents pointed out whether they perceive the different quality of the food sold in the Slovak market. On this question, up to 85% of respondents answered positively, so they think the quality of the food sold in the Slovak market is different. After all, we can not be surprised because food problems are constantly appearing. Whether we refer to milk, sugar, butter or dual food quality recently promoted by media (Aarseth and Olsen, 2006). A minority of respondents (15%) believe that the quality of food sold on the Slovak market does not differ from other foods offered in the market.

The following questions of the questionnaire survey focused on the food safety and quality of the food products. The respondents were asked how they perceive the safety of food produced in Slovakia, produced abroad and sold in Slovakia. In addition, they should express their opinion on the quality of food produced and sold in Slovakia and produced abroad and sold in Slovakia (Figure 2).

The Figure 2 shows that significant differences between individual responses can be observed for issues related to the safety and quality of food produced and sold on the Slovak market. For these questions, most respondents expressed their "rather high" response. The results of the survey therefore show that the respondents have positive experience, whether from a health or quality point of view, on the food market of the Slovak market. This fact is clearly caused by the informational interest of the respondents, ie. consumers are becoming more and more demanding and therefore require basic information about purchased food. However, as regards the safety and quality of food produced abroad and sold on the Slovak market, in these answers, Figure 2 also shows the dissatisfaction of respondents with the quality of imported food. While the safety of food produced abroad and marketed in Slovakia reached the highest possible "rather high" range, the quality of food produced abroad and sold in Slovakia was "rather low". This decision could have been affected by the recent scandal over the dual quality of food. Since it has been found that products produced under one brand have a different qualitative composition in the individual countries of the European Union.

The results of research in Slovakia confirmed that Slovaks are most often dissatisfied with the freshness and quality of food in shops. This also results from a long-term review of the Staffino assessment system and the consumer portal Gazduj.sk, which involved 1070 customers purchasing food in all chains in Slovakia. Of these, 24% voiced dissatisfaction with freshness and quality of food (Staffino and Gazduj.sk, 2017).

In connection with the solution of the pre-identified problems, the hypothesis was statistically verified to prove whether there does not exist a difference between the quality of food produced abroad and in Slovakia.

H₀: There does not exist a difference between the quality of food produced abroad and in Slovakia.

H₁: There exist a difference between the quality of food produced abroad and in Slovakia.

To verify the hypothesis, the Wilcoxon signed rank test and significance level were used:

$$p = 0.0001 < \alpha = 0,05$$

Based on the test results, we accept the hypothesis H₁ and claim that with 95% reliability there exist a difference between the quality of food produced abroad and in Slovakia. Based on the results of the Wilcoxon signed rank test, the H₀ hypothesis is rejected.

According to data obtained from the questionnaire survey, consumers pay attention to the quality of the purchased food products. This was answered by 83% of the respondents.

At present, people have greater opportunities than ever before, say the authors Bloch, (2008) and Hultén, (2012). Most of them already buy on the basis of the visual sense, or when they buy food, they also use olfactive.

Figure 3 shows the results on the question regarding the feedback whether the respondents felt some change in food production in the Slovak. This change was related to food safety after 2010.

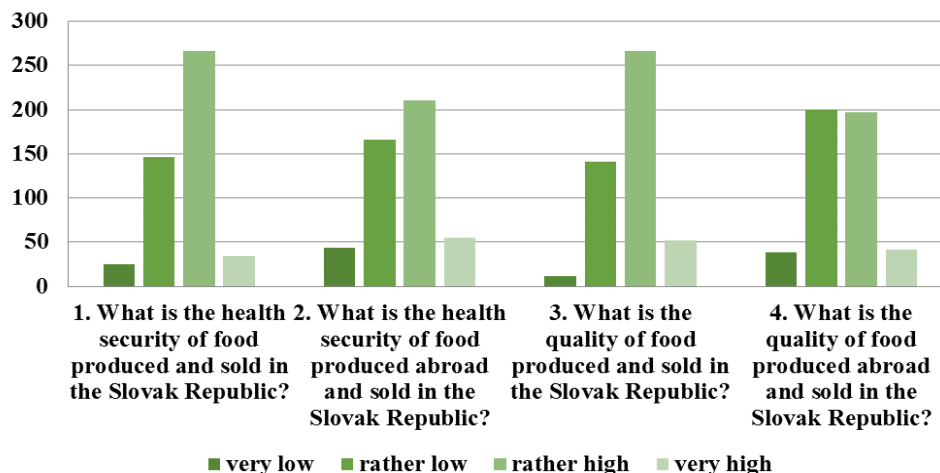


Figure 2 Food Safety and Quality.

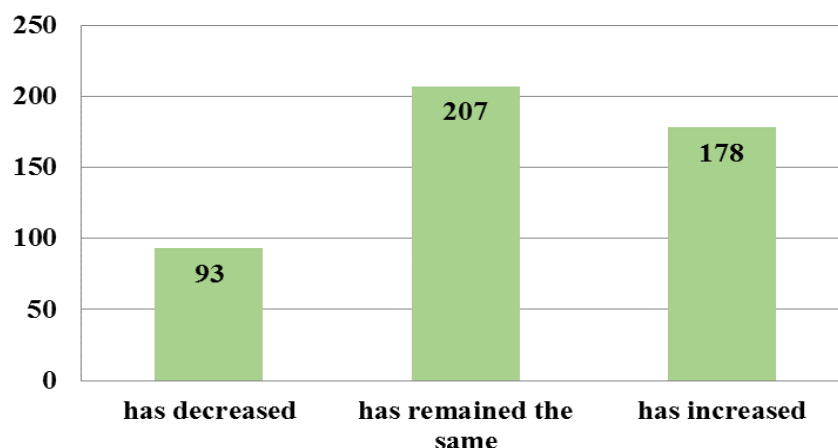


Figure 3 Change related to Food Safety after 2010.

The most respondents did not notice any change in the food safety after 2010. This unchanging feeling was marked by 43% of the respondents. In the second place was the option "increased" (37%). This could have been due to the introduction of various indicators of quality and health safety of purchased foods. 93 of the respondents felt that the safety of Slovak foodstuffs had diminished. Their negative assessment is accompanied by national awareness of individual types of food and also by various scandals of Slovak products. As an example, the meat content and the substitution of pepper for another dye in Spišské sausages. (Trienekens and Zuurbier, 2007).

Following the obtained answers took place the statistical testing of hypothesis No. 2 – there does not exist a difference between the health security of food produced abroad and in Slovakia.

H₀: There does not exist a difference between the health safety of food produced abroad and in Slovakia.

H₁: There exists a difference between the health safety of food produced abroad and in Slovakia.

Statistical testing was performed by using the Wilcoxon signed rank test and significance levels:

$$p = 0.0819 > \alpha = 0.05$$

Based on the test results, we accept a zero hypothesis and claim that with 95% reliability there does not exist a difference between the health security of food produced abroad and in Slovakia. Based on the results of the Wilcoxon signed rank test, we accept the H_0 hypothesis. In response to various food scandals, the respondents had been asked the question related to the health safety of food sold in Slovakia (Figure 4).

Only more than half of respondents (56%) consider health food safety control in the Slovak market to be reasonable. However, 17% of the total reported that food safety control is considered to be very good, and 18 questioned found this control to be inadequate. Questions of this type are based rather on the subjective opinion of the respondent (Jarvis, 2017). Not everyone can have only positive or negative experience. In this case are important also the recommendations or potentially negative experiences that have been seen or directly noticed at the grocery store. Negative views are even deepened by various media scandals. The fact is that a dissatisfied consumer shares his negative experience with seven other consumers. However, he shares a positive experience with only two other consumers (Tsui, Nifadkar and Ou, 2007).

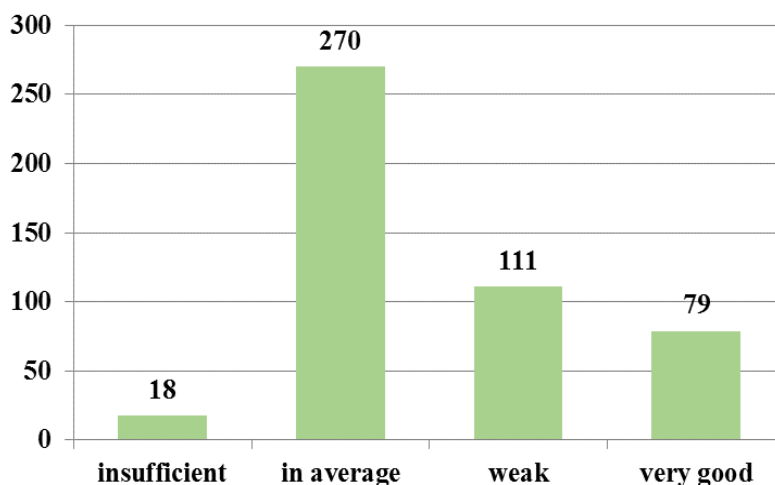


Figure 4 Control of Health Food Safety.

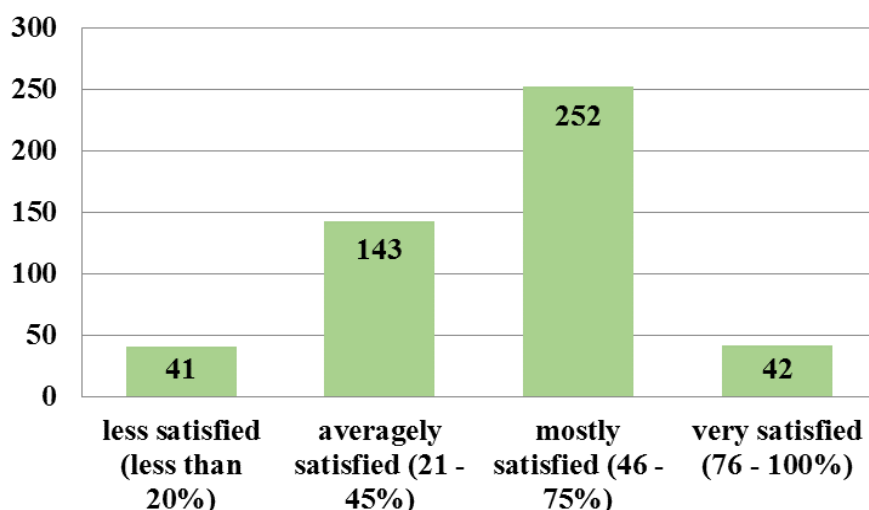


Figure 5 Satisfaction with Hygiene Conditions of Food Sales.

In view of the previous answers of respondents involved in the questionnaire survey took place the statistical testing of hypothesis No. 3 – there does not exist a difference between the quality and safety of food produced in the Slovak market.

H₀: There does not exist a difference between the quality and safety of food produced in the Slovak market.

H₁: There exists a difference between the quality and safety of food produced in the Slovak market.

To verify hypothesis No. 3, the Chi-square test of independence and the level of significance were used:

$$p = 0.3946 > \alpha = 0.05$$

Based on testing, we accept a zero hypothesis and claim that with 95% reliability there is no difference between the quality and safety of food produced on the Slovak market. Another question was devoted to the issue of hygienic conditions of food sales in food stores operating in Slovakia (Figure 5).

From the answers to the question “Are you satisfied with the hygiene conditions of food sales?”, almost 9% of respondents were very satisfied and up to 53% expressed their satisfaction with hygienic conditions in the food stores. Their satisfaction stems not only from the cleanliness and lighting of the store, but also from the use of various protective equipment available in the food stores in those departments where is required their use. Relatively good results were also achieved in the second group of respondents (30%) who presented an average satisfaction with the hygienic conditions observed in the sale of fresh food in Slovakia. It is obvious that this group of people has already experienced some negative food hygiene experience (eg: non-compliance with the use of sanitary protection equipment for storing, especially fresh food).

In a research by **Paden et al. (2017)**, 35% of respondents had negative hygienic experience, which was mainly associated with non-compliance with hygiene rules by buyers in handling food without the use of protective equipment. The least respondents (more than 8%)

presented their satisfaction as "not very satisfied". This satisfaction was clearly caused by a negative experience in which the hygiene conditions were seriously violated (eg spoiled meat). Based on a survey conducted by **the Retail Magazine (2016)**, it was found out that nearly 40% of the population has no knowledge about harmfulness of food after the date of consumption.

The conclusion of the questionnaire survey resulted in the testing of hypothesis No. 4 – there does not exist a difference between health food safety control and food quality control.

H₀: There does not exist a difference between health food safety control and food quality control.

H₁: There exists a difference between health food safety control and food quality control.

To test the hypothesis No. 4, the Friedman test and the level of significance were used:

$$p = 0.1605 > \alpha = 0.05$$

Based on testing, we can say that we accept a zero hypothesis and claim that with 95% reliability, there does not exist a difference between health food safety control and food quality control.

The last question was focused on the availability of quality food in stores. The most respondents (78%) replied that quality food is already available in many chain of stores in the Slovak market. The availability of high-quality food within the European Union confirmed the survey by **Sirri (2017)** and 86% of its respondents. 22% of respondents reported problematic availability of quality food. This problem can be caused by the fact that up to 47% of the respondents live in a village where the food stores are managed by the small businessmen or tradesmen. Their primary goal is to generate the profit.

CONCLUSION

Based on the research, it was confirmed that the vast majority of consumers perceive the different quality of sold food in the Slovak market. The submitted paper

showed that up to 406 respondents (85%) felt different quality of purchased food in the Slovak market. The quality of food produced abroad and sold on the Slovak market is perceived by consumers as low. Therefore, the respondents perceive the difference between the quality of food produced abroad and the quality of food produced in Slovakia. The lower quality of food produced abroad was confirmed by statistical testing. The low quality of foreign food was marked by 42% of respondents, which is a relatively high number.

Customers encounter different levels of hygiene in the food stores. Over half of respondents (53%) said they were satisfied with hygienic sales conditions. Despite the fact that more than half of respondents have expressed their satisfaction with hygienic conditions, there are still many of those respondents who more or less expressed their dissatisfaction with problems related to hygiene in the food stores. Failure to adhere to proper hygiene conditions can have serious consequences for human health.

Results of the questionnaire survey confirmed that up to 78% of respondents reported the regular availability of quality food in the stores. Consumers are gradually becoming more rational, especially in terms of information literacy. As there is a wide range of food products in store, many respondents try to choose the food according to their own mind. For these reasons, they seek to obtain the necessary information by studying, reading information on product labels, and in many cases also via Internet. This fact was also confirmed by the results of the survey, when up to 83% of respondents said the food quality was considered to be one of the most important factors influencing their choice and purchase of food. One of the reasons for this is the negative information presented in different media, but also the disclosure of various unfair practices and misleading media campaigns. However, there still remains the question, until when will be the consumers willing to listen from various sources about poor food in the Slovak market. The basic question of each consumer must be to be informed about the individual food produced in Slovakia and imported from abroad. Customers should also be aware of the uniqueness and quality of the food produced in the domestic market, the purchasing of which is necessity for domestic producers and, last but not least, the economy of the state.

REFERENCES

Aarseth, H., Olsen, B. M. 2006. Food and masculinity in dual-career couples. *Journal of Gender Studies*, vol. 17, no. 4, p. 277-287. <https://doi.org/10.1080/09589230802419922>

Bloch, M. 2008. Truth and sight: generalizing without universalizing. *Journal of the Royal Anthropological Institute*, vol. 14, no. 1, p. 522-532. <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9655.2008.00490.x/full>

Boeck, E. D., Jacxsens, L., Mortier, V. A., Vlerick, P. 2018. Quantitative study of food safety climate in Belgian food processing companies in view of their organizational characteristics. *Food Control*, vol. 88, p. 15-27. <https://doi.org/10.1016/j.foodcont.2017.12.037>

DNES24. 2017. Slovaks in stores are most concerned about the freshness and quality of food: they also have long advices. (Slovákov v obchodoch najviac trápí

čerstvosť a kvalita potravín: hnevajú aj dlhé rady). Available at: <http://www.dnes24.sk/slovakov-v-obchodoch-najviac-trapi-cerstvost-a-kvalita-potravin-hnevaju-aj-dlhe-rady-277813>

Duncan, T. V. 2011. Applications of nanotechnology in food packaging and food safety: Barrier materials, antimicrobials and sensors. *Journal of Colloid and Interface Science*, vol. 363, no. 1, p. 1-24. <https://doi.org/10.1016/j.jcis.2011.07.017>

Feldmann, C., Hamm, U. 2015. Consumers' perceptions and preferences for local food: A review. *Food Quality and Preference*, vol. 40, part. A, p. 152-164. <https://doi.org/10.1016/j.foodqual.2014.09.014>

Géci, A., Nagyová, E., Rybanská, J. 2017. Impact of sensory marketing on consumer's buying behaviour. *Potravinárstvo*, vol. 11, no. 1, p. 709-717. <https://dx.doi.org/10.5219/835>

Golian, J., Sokol, J. 2005. Education and research for food safety. (Vzdelávanie a výskum pre bezpečnosť potravín). *Food Safety and Control: Proceedings of the International Scientific Conference. (Bezpečnosť a kontrola potravín : Zborník prác v medzinárodnej vedeckej konferencie)*. Nitra, Slovakia : Slovak University of Agriculture in Nitra, 2005, s. 53. ISBN 80-8069-503-2 (In Slovak)

Gorris, L. 2005. Food safety objective: An integral part of food chain management. *Food Control*, vol. 16, no. 9. <https://doi.org/10.1016/j.foodcont.2004.10.020>

Grunert, K. G., Achmann, K. 2016. Consumer reactions to the use of EU quality labels on food products: A review of the literature. *Food Control*, vol. 59, p. 178-187. <https://doi.org/10.1016/j.foodcont.2015.05.021>

Hinks, D., Shamey, R. 2011. Review of retail store lighting: implications for colour control of products. *Coloration Technology*, vol. 127, no. 2, p. 121-128. <http://doi.org/10.1111/j.1478-4408.2011.00286.x>

Holienčinová, M. 2013. Consumer behavior in the market for alcoholic beverages. (Spotrebiteľské správanie na trhu alkoholických nápojov). *Marketing management, business and social aspects of business. (Marketing manažment, obchod a sociálne aspekty podnikania)*, p. 170-079.

Hultén, B. 2012. Sensory cues and shoppers' touching behaviour: the case of IKEA. *International Journal of Retail & Distribution Management*, vol. 40, no. 4, p. 273-289. <https://doi.org/10.1108/09590551211211774>

Chrysochou, P., Krystallis, A., Giraud, G. 2012. Quality assurance labels as drivers of customer loyalty in the case of traditional food products. *Food Quality and Preference*, vol. 25, no. 2, p. 156-162. <https://doi.org/10.1016/j.foodqual.2012.02.013>

Jarvis, S. 2017. The story on global health security. *Veterinary Record*, vol. 181, no. 5, p. 100. <http://doi.org/10.1136/vr.j3596>

King, T., Cole, M., Farber, M. J., Eisenbrand, G., Zabarás, D., Fox, M. E., Hill, P. J. 2017. Food safety for food security: Relationship between global megatrends and developments in food safety. *Trends in Food Science & Technology*, vol. 68, p. 160-175. <https://doi.org/10.1016/j.tifs.2017.08.014>

- Kozelová, D., Mura, L., Matejková, E., Lopašovský, E., Vektoris, V., Mendelová, A., Bezákova, M., Chreneková, M. 2011. Organic products, consumer behavior on market and european organic product market situation. *Potravinárstvo*, vol. 5, no. 3, p. 20-26. <https://doi.org/10.5219/96>
- Krishna, A. 2013. Introduction: What Is Sensory Marketing? In *Customer Sense*, New York, USA : Palgrave Macmillan. p. 1-18. ISBN: 978-1-349-34442-0 https://doi.org/10.1057/9781137346056_1
- Kubicová, E., Kádeková, Z. 2017. *Strategic marketing*. 1st edition. Nitra, Slovakia : Slovak University of Agriculture. 143 p. ISBN 978-80-552-1622-5
- Kubicová, E., Kádeková, Z. 2012. Revenue impact on the demand of slovak households for meat and meat products. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, vol. 50, no. 2, p. 503-510.
- Kubicová, E., Kádeková, Z. 2011. Comparison of the income development and the food demand elasticities of the private households in Slovakia. *Agricultural economics*, vol. 57, no. 8, p. 404-411.
- Food quality and safety. (Kvalita a bezpečnosť potravín)*. 2018. Available at: <http://www.biznis.sk/kvalita-a-bezpecnost-potravin/>
- Lee, H.-J., Yun, Z.-S. 2015. Consumers' perceptions of organic food attributes and cognitive and affective attitudes as determinants of their purchase intentions toward organic food. *Food Quality and Preference*, vol. 39, p. 259-267. <https://doi.org/10.1016/j.foodqual.2014.06.002>
- Lindstrom, M. 2006. Brand Sense: How to Build Powerful Brands Through Touch, Taste, Smell, Sight and Sound. *Strategic Direction*, vol. 22 no. 2. <https://doi.org/10.1108/sd.2006.05622bae.001>
- Loureiro, M. L., Umberger, W. J. 2007. A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability. *Food Policy*, vol. 32, no. 4, p. 496-514. <https://doi.org/10.1016/j.foodpol.2006.11.006>
- Loutfi, A., Coradeschi, S., Mani, K. G., Shankar, P., Rayappan, B. B. J. 2015. Electronic noses for food quality: A review. *Journal of Food Engineering*, vol. 144, p. 103-111. <https://doi.org/10.1016/j.jfoodeng.2014.07.019>
- Magnier, L., Schoormans, J., Mugge, R. 2016. Judging a product by its cover: Packaging sustainability and perceptions of quality in food products. *Food Quality and Preference*, vol. 53, p. 132-142. <https://doi.org/10.1016/j.foodqual.2016.06.006>
- Maratto, G., Simeone, M., Nazzaro, C. 2014. Product reformulation in the food system to improve food safety. Evaluation of policy intervention. *Appetite*, vol. 74, p. 107-115. <https://doi.org/10.1016/j.appet.2013.12.003>
- McFadden, J. R., Huffman, W. E. 2017. Consumer valuation of information about food safety achieved using biotechnology: Evidence from new potato products. *Food Policy*, vol. 69, p. 82-96. <https://doi.org/10.1016/j.foodpol.2017.03.002>
- Michaelidou, N., Hassan, L. M. 2007. The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International Journal of Consumer Studies*, vol. 32, no. 2, p. 163-170. <https://doi.org/10.1111/j.1470-6431.2007.00619.x>
- Nagyová, L., Berčík, J., Horská, E. 2014. The efficiency, energy intensity and visual impact of the accent light in the retail grocery stores. *Potravinárstvo*, vol. 8, no. 1, p. 296-305. <https://doi.org/10.5219/398>
- Njage, K. M. P., Opiyo, B., Wangoh, J., Wambui, J. 2018. Scale of production and implementation of food safety programs influence the performance of current food safety management systems: Case of dairy processors. *Food Control*, vol. 85, p. 85-97. <https://doi.org/10.1016/j.foodcont.2017.09.015>
- Pable, A., Lu, S., Auerbach, J. 2010. Integrated qualitative/quantitative techniques for food product quality planning. *Journal of Food Quality*, vol. 33, no. 1, p. 112-129. <https://doi.org/10.1111/j.1745-4557.2009.00287.x>
- Paden, H., Hatsu, I., Lustberg, M., Grenade, C., Kane, K., Mo, K., Ilic, S. 2017. Factors Associated with Food Safety Behaviors in Cancer Patients Seeking Treatment. *The FASEB Journal*, vol. 31, no. 1.
- Pavelková, A., Bobková, A. 2008. Quality policy - labeling of agricultural products and foodstuffs. (Politika kvality – označovanie poľnohospodárskych výrobkov a potravín). *Food Safety and Control: Proceedings of the International Scientific Conference. (Bezpečnosť a kontrola potravín : Zborník prác v medzinárodnej vedeckej konferencii)*. Nitra : SPU, 2008, p. 20. ISBN 978-80-552-0350-8.
- Food Code of the Slovak Republic. (Potravinový kódex Slovenskej republiky)*. 2017. Part Two - General Requirements. (Druhá časť – všeobecné požiadavky). Available at: http://www.svps.sk/legislativa/legislativa_kodex.asp
- Retail magazin. 2016. *Due to the expiration date, food quality does not change. (Uplynutím dátumu trvanlivosti sa kvalita potravín nemení)*. Available at: <http://www.retailmagazin.sk/produkt/potravinarsky-sortiment/1423-uplynutim-datumu-trvanlivosti-sa-kvalita-potravin-nemeni>
- Rompay, van J. L. T., Deterink, F., Fenko, A. 2016. Healthy package, healthy product? Effects of packaging design as a function of purchase setting. *Food Quality and Preference*, vol. 53, p. 84-89. <https://doi.org/10.1016/j.foodqual.2016.06.001>
- Shang, X., Tonsor, G. T. 2017. Food safety recall effects across meat products and regions. *Food Policy*, vol. 69, p. 145-153. <https://doi.org/10.1016/j.foodpol.2017.04.002>
- Shi, X., Zhu, X. 2009. Biofilm formation and food safety in food industries. *Trends in Food Science & Technology*, vol. 20, no. 9, p. 407-413. <https://doi.org/10.1016/j.tifs.2009.01.054>
- Sirri, F., Petracchi, M., Zampiga, M., Meluzzi, A. 2017. Effect of EU electrical stunning conditions on breast meat quality of broiler chickens. *Poultry Science*, vol. 96, no. 8, p. 3000-3004. <https://doi.org/10.3382/ps/pex048>
- Stecová, E., Popelka, P. 2005. Hygiene of food. (*Hygiena potravín*). 1. vyd. Bratislava, Slovakia : Proxima press. 2005. p. 287. ISBN 80-85454-94-7.
- Suchánek, P., Richter, J., Králová, M. 2017. Customer Satisfaction with Quality of Products of Food Business. *Prague Economic Papers*, vol. 2017, no. 1, p. 19-35. <https://doi.org/10.18267/j.pep.595>

Trienekens, J., Zuurbier, P. 2008. Quality and safety standards in the food industry, developments and challenges. *International Journal of Production Economics*, vol. 113, no. 1, p. 107-122. <https://doi.org/10.1016/j.ijpe.2007.02.050>

Tsui, A. S., Nifadkar, S. N., Ou, A. Y. 2007. Cross-National, Cross-Cultural Organizational Behavior Research: Advances, Gaps, and Recommendations. *Journal of Management*, vol. 33, no. 3, p. 426-478. <https://doi.org/10.1177/0149206307300818>

Waldman, K. B., Kerr, J. M. 2018. Does safety information influence consumers' preferences for controversial food products? *Food Quality and Preference*, vol. 64, p. 56-65. <https://doi.org/10.1016/j.foodqual.2017.10.013>

Yu, H., Gibson, E. K., Wright, G. K., Neal, A. J., Sirsat, A. S. 2017. Food safety and food quality perceptions of farmers' market consumers in the United States. *Food Control*, vol. 79, p. 266-271. <https://doi.org/10.1016/j.foodcont.2017.04.010>

Act no. 215/2004 Coll. 2004 of The Slovak Republic. (Zákon č. 215/2004 Z. z. 2004). *The Act on the Protection of Classified Information and on Amendments to Certain Acts. (Zákon o ochrane utajovaných skutočností a o zmene a doplnení niektorých zákonov)*.

Zhang, M., Jin, Y., Qiao, H., Zheng, F. 2017. Product quality asymmetry and food safety: Investigating the "one farm household, two production systems" of fruit and vegetable farmers in China. *China Economic Review*, vol. 45, p. 232-243. <https://doi.org/10.1016/j.chieco.2017.07.009>

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Contact address:

prof. Ing. Ludmila Nagyová, PhD., Slovak University of Agriculture, Faculty of Economics and Management, Department of Marketing and Trade, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, E-mail: ludmilanagyova@hotmail.com

prof. Ing. Jozef Golian, Dr., Slovak University of Agriculture, Faculty of Biotechnology and Food sciences, Department of Food hygiene and Safety, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, E-mail: jozef.golian2311@gmail.com

Ing. Andrej Géci, Slovak University of Agriculture, Faculty of Economics and Management, Department of Marketing and Trade, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, E-mail: geci.andrej@gmail.com

Ing. Jozef Palkovič, PhD., Slovak University of Agriculture, Faculty of Economics and Management, Department of Statistics and Operations Research, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, E-mail: jozef.palkovic@uniag.sk

Ing. Jozef Čapla, PhD., Slovak University of Agriculture, Faculty of Biotechnology and Food sciences, Department of Food hygiene and Safety, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, E-mail: jozef.capla@uniag.sk

Ing. Zdenka Kádeková, PhD., Slovak University of Agriculture, Faculty of Economics and Management, Department of Marketing and Trade, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, E-mail: zdenka_kadekova@yahoo.com