

FOOD SAFETY PERCEPTIONS INFLUENCED BY ONLINE TRADE IN FOODSTUFFS

Gergana BALIEVA

Trakia University, Campus, Stara Zagora, Bulgaria, E-mail: gergana.balieva@trakia-uni.bg

Corresponding author: gergana.balieva@trakia-uni.bg

Abstract

With the constantly growing world population the need for securing sufficient and safe food resources has also raised greatly. Examining the new pattern in consumers' behavior influenced by the Covid-19 pandemic with a shift towards online trade in foodstuffs, the present study aimed to investigate the consumers' perceptions on various aspects of food safety based on their experience in internet shopping. Based on an anonymous questionnaire among 470 Bulgarians the survey found that the main problems the respondents encountered through online food shopping were related to quality discrepancy (18.9%), damaged package (18.5%) and unknown origin of the product (12.3%). As important indicators of the safety of the product bought the respondents pointed out labels with expiry date (19.1%), intact package (13.2%) and temperature at delivery (13.2%). In conclusion, online purchase food products were considered safe for the consumers' health as stated by half of the respondents whose perceptions on food safety were significantly dependent ($p < 0.05$) on their experience in e-trade during and after the Covid-19 epidemic.

Key words: food safety, Covid-19, e-trade, consumers

INTRODUCTION

With the estimated increase in population worldwide and the need to feed billions of people, the integrated policy on the whole food chain emphasizes the importance of sustainability and balance between food security, food safety and fair distribution of resources [35]. Regulatory frameworks, international and national legislation are provided in this regard by organisations like FAO, WTO, Codex Alimentarius Commission and others [2, 9] to ensure food safety and manage policies on food trade as food production is the largest economy in the world [16]. These policies have to be implemented globally by all stakeholders like industries, consumers and public bodies [33] in order to manage the challenge to food security posed by the increase in food trade [36]. The measures to ensure food chain sustainability should address all its aspects, from the field or the farm to the consumer's table [1], along with the challenges encountered in e-trade and post-Covid-19 effects as well [6, 39, 26, 19]. There was reported a steady increase in the share of people who preferred to shop for goods online

over the last years and for Bulgaria the e-shoppers who before the pandemic accounted to 31% in 2018 reached 53% in 2023 [21]. Similar rise was reported in other countries as well, with food sales representing the largest category of e-commerce [3]. Some of the main drivers for the online trade in food products were related to safety and health issues [18], while in the meantime a stable group of Millennial and Generation Z internet shoppers emerged with interest in "green consumerism" and healthy products [21, 29]. The Covid-19 pandemic affected greatly the consumers' perceptions of food security, safety and hygiene [8] which led to changes in their purchasing behaviour [26] and the need to understand the stakeholders' awareness and knowledge on food safety indicators in their online shopping experience [13]. From the perspective of ensuring the safety of the integrated food chain it is of crucial importance to have every individual involved in the process [19], to reform and improve the food safety regulation system through co-regulation between stakeholders [7]. Thus, societies could effectively manage to control the risks and hazards along the food chain [10], especially when innovations,

digitalization and e-trade are incorporated into sustainable food operations [14].

With regard to the current development of the online trade in foodstuffs, the purpose of the paper is to evaluate how the e-shopping experience had affected the consumers' behaviour in terms of food safety.

MATERIALS AND METHODS

Design of Survey

The author has conducted the survey [4] in the period from February-March 2020 before the spread of the Covid-19 crisis and later, during the pandemic in September 2020-March 2021. The second part of this research is presented in the current paper. The survey was under the form of an anonymous questionnaire among 470 Bulgarian citizens distributed at random to willing to participate respondents, without the necessity of ethics committee approval. The survey questions were focused on the respondents' demographics and their awareness on indicators related to food safety during online shopping.

Statistical Analysis

The completed questionnaires were statistically processed (IBM SPSS-Inc., 2019, SPSS Reference Guide 26 SPSS, Chicago, USA) after conversion of the respondents' answers from textual statements into numerical values. The parameters studied were analysed through descriptive statistics (frequency distribution tables), Student t-test and chi-square. A two-tailed $p < 0.05$ was considered significant. The results afterwards were presented on diagrams (Excel, Windows 10).

RESULTS AND DISCUSSIONS

Concerns of food safety, especially in e-trade, are highly influenced by a number of factors that affect consumers' attitudes as shown on Figure 1. With regard to the safety of online purchased food, the respondents in our survey focused on the correct labelling of the product they received, including expiry date (19.1%), intact package (13.2%) and temperature of the food at the time of delivery (13.2%) (Fig. 1).

With the increase in the online trade in agricultural products worldwide food labelling was pointed out as an important factor for consumers' decision making and at the same time it raised issues with the lack of strict requirements on labelling in e-commerce and varying information presented among the online shops [22]. Although the European food market and in particular the food information provided to the customers were included in the current legislative framework [11], [31] stated that a comprehensive system for online food safety regulation was needed by which the stakeholders' concerns had to be addressed, including potential health threats due to mislabeling and substitution [19]. Other issues that could highly disturb the online food supply chains for both the business operators and the consumers, appeared to be the possibilities of food contamination as a result of damaged packaging. In consistence with our findings [8] argued that the integrity of food package was associated with the hygiene perceptions of the users of online food supply channels, especially after the Covid-19 pandemic. Furthermore, another factor considered important and significantly observed during the Covid-19 outbreak ($\chi^2 = 19.478$; $df=4$; $p=0.001$) was the right temperature at the online deliveries which was found also crucial for preventing food spoilage [19].

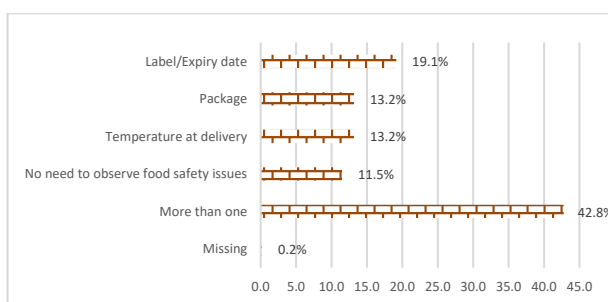


Fig. 1. Indicators observed by the consumers regarding food safety of online bought food products

Source: Author's data from the questionnaire survey.

There was a share of 11.5% of the respondents whose opinion that it was not necessary for the consumers to consider food safety issues which were perceived as a responsibility of the competent authorities along the food chain, were significantly

dependent on their e-shopping experience during Covid-19 epidemic ($t[469]= 24.207$; $p=0.000$) [3]. Their awareness was based on the strict legislative framework which regulated food safety at international level in all aspects, including trade [2, 35] altogether with the obligations of the authorities to execute official control at all stages of the agri-food chain [12].

However, several indicators failed to comply with the consumers' expectations of the delivered food (Fig. 2) purchased online at the time of the pandemic ($\chi^2 =18.460$; $df=8$; $p=0.018$) – low quality of the product (18.9%), damaged package with risks of contamination (18.5%), mislabeling or lack of labels at all without information of the origin of the product (12.3%), price discrepancies (9.8%), as well as expired food (5.3%) and spoiled products unfit for consumption (4.9%). These concerns were directly related to food safety and hygiene issues which were recognized as a major challenge in ensuring smooth operation of e-trade, together with price value of the goods [28].

[19] reported that intact package could prevent the online purchased products from risk of contamination until their final delivery, in line with our findings that the damaged food packaging was significantly hazardous during the Covid-19 shopping ($t[464]= 24.955$; $p=0.000$). Food poisoning appeared to be a significant safety risk throughout the food chain and consumers needed guarantees that could reduce such hazards [40]. Spoiled food as detected by the participants in our survey was unfit for consumption and moreover, it posed additional health risks due to the possible bacterial activity in the spoiled products and subsequent food poisoning [2]. However, food safety issues could be properly managed by the consumers themselves if they were able to identify the major risks in the process of online food purchasing, as recognized by our respondents, and had knowledge on safe food supply steps, labeling of the products with relevant information (ingredients, expiry date, origin, etc.) and food-borne diseases that could affect their health [36].

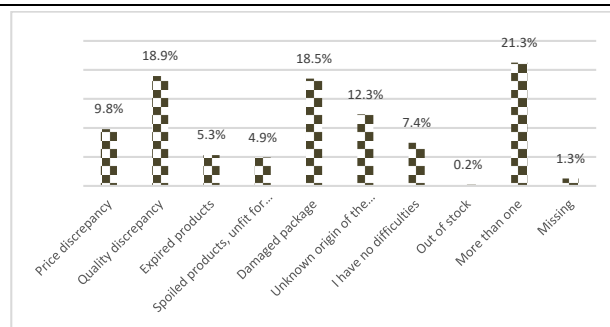


Fig. 2. Problems encountered during online food shopping

Source: Author's data from the questionnaire survey.

The analysis of the consumers' perceptions of the overall safety of food purchased online during and after the Covid-19 pandemic showed that more than half of the participants in the survey strongly believed (21.3%) and agreed (34%) the e-traded food products were safe for their health (Fig. 3) ($\chi^2 =41.950$; $df=4$; $p=0.000$). As direct users at the end of the food chain consumers expected to receive high quality and safe food [36], but the Covid-19 epidemic disturbed the supply chain and raised challenges to storage, transportation and distribution of food products with increased risks of physical, chemical and biological hazards [10, 36]. However, standards and laws set by the World Trade Organisation (WTO) created a practical framework to ensure food safety throughout the entire food chain [9]. The integrated food policy had further developed in order to engage all key stakeholders from both public and private sectors, consumers and researchers included [17] to address the new personalized consumption model after the Covid-19 epidemic and co-regulate the food market and ensure food safety in online trade as well [3]. At the end, it appeared that consumers possessed varying awareness and knowledge on food hygiene and safety at the time they formed their purchasing behavior – from insufficient level of food safety awareness [24, 37] to good understanding on food safety culture [25] which could be additionally advanced by spreading health awareness by researchers and studies [13, 15]. Compared to the other authors' findings our research proved high awareness on the main food safety concepts among consumers in their online purchases (Fig. 1, Fig. 2).

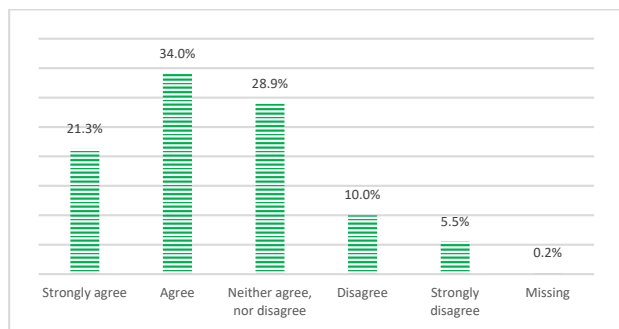


Fig. 3. Consumers' general perceptions on food safety of online purchase food
 Source: Author's data from the questionnaire survey.

The emerging pattern of purchasing behaviour during and after the Covid-19 outbreak became more personalized and affected by consumers' heterogeneous demographics. Analysis of our respondents' characteristics showed that they were primarily from urban origin, nearly half of them being university students and similar share being employed, thus falling in the age group between 18 and 25 (Table 1) [4]. Similar profile of young, educated urban residents who changed their shopping behaviour from offline to online was reported as well by [30, 38, 29, 5].

Table 1. Respondents' demographic characteristics*

Respondents' Demographics	Count	%
<i>Residence</i>		
1) Capital city	50	10.6
2) City-Regional administrative centre	288	61.3
3) City-Municipal administrative centre	91	19.4
4) Town	7	1.5
5) Village	31	6.6
<i>Occupation</i>		
1) High school student (<18 years old)	19	4.0
2) University student (18-25 years old)	228	48.5
3) Unemployed	12	2.6
4) Employed (25-60 years old)	204	43.4
5) Retired (60 > years old)	7	1.5
<i>Pre-Covid 19 / During Covid 19 Pandemic e-shopping</i>		
1) Pre-Covid 19	77	16.4
2) During and after Covid 19 Pandemic	393	83.6

*Due to rounding of values some indicators may not sum up to 100%
 Source: Author's data from the questionnaire survey (Balieva, 2023)

Studies showed that the age of the participants and the impact of the pandemic affected their decision making for buying food products

online [13, 20]. Respondents' awareness on food safety and hence online food purchasing was significantly dependent on age range [26] with being young and with university education resulting in higher food safety culture [25, 34, 23].

However, [24] stated that stakeholders' awareness and knowledge on food safety should be further improved and education on food related safety and hygiene indicators for students could improve consumers' awareness [32]. Providing relevant information and knowledge to stakeholders was found by [39] to enhance food risk prevention behaviours among people.

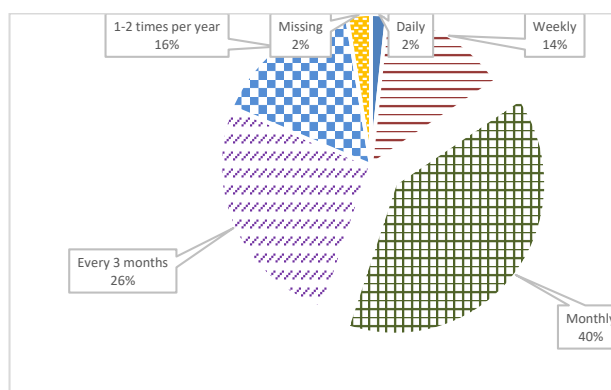


Fig. 4. Frequency of food purchasing through e-channels
 Source: Author's data from the questionnaire survey.

The changing pattern of food trade with a significant increase in the share of e-trade is visible in the consumers' purchasing behavior shifts towards more frequent online purchases of food products (Fig. 4). The survey showed that 40 % of the respondents were used to monthly e-shopping, especially for products with long shelf life like some processed and canned food from animal origin like dairy (cheese, yellow cheese, etc.), conserved meat and sausages, honey and bee products, grains and others, which was significantly important issue during the Covid-19 outbreak ($t[458]=32.699; p=0.000$). Weekly online purchased by 14% of the consumers were eventually more fresh products like fruit and vegetables, organic food, confectionery, etc. This appeared to be quite a small share compared to the findings of [27] who reported that 64% of their respondents were actively purchasing online food on a weekly basis. In fact, our

results were in consistence with the officially reported data of 17% rate of online bought food from shops or meal-kit providers for the 27 European member states [21].

CONCLUSIONS

Recent food crises caused by the Covid-19 outbreak posed serious threats to public health and food safety and challenges to the agri-food sector.

The survey focused on the level of awareness and perceptions of main indicators related to food safety among a heterogeneous group of respondents who had regular experience in online food shopping on weekly and monthly basis.

The respondents were mainly urban residents, with university education and young people whose food purchasing behaviors through e-channels were influenced by parameters like food labelling and expiry date of the products, intact package and right temperature at the time of delivery. The main problems faced by the consumers during online food shopping were related to quality and price discrepancies, damaged packaging with risk of contamination and food spoilage and mislabeling with unknown origin of the product. However, based on the consumers' overall perceptions, the foodstuffs bought online were considered safe by half of the respondents.

ACKNOWLEDGEMENTS

The author expresses her gratitude to all the participants who filled in the questionnaire. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

- [1]Aday, S., Aday, M. S., 2020, Impact of Covid-19 on the food supply chain. *Food Quality and Safety*, 4, 167–180. doi:10.1093/fqsafe/fyaa024
- [2]Afzaal, S., Khan, N. U., 2019, Microbial Food Safety Management in Global Trade: Role of WTO-SPS Agreement. *Acta Scientific Microbiology Special Issue 1*: 29-30.
- [3]Aprilianti, I., Amanta, F., 2020, Promoting Food Safety in Indonesia's Online Food Delivery Services.

Policy Paper No. 28 Center for Indonesian Policy Studies. DOI: 10.13140/RG.2.2.29722.67524

[4]Balieva, G., 2023, Online Food Purchasing During Covid-19 Pandemic. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, Vol.23(2)2023, 51-57.

[5]Beliya, A., Kujur, R., Verma, M., Nagwanshi, K. V., Sahu, S., Uikey, N., Bhat, A. A., 2019, Satisfaction of consumers by using online food services, *International Journal of Humanities and Social Sciences (IJHSS)* Vol. 8(4), 35-44.

[6]Bittsrich, D., 2024, Food Safety in Global Trade: Opportunities and Challenges to Trade Harmonization Editor(s): Geoffrey W. Smithers, *Encyclopedia of Food Safety (Second Edition)*, Academic Press, 2024, 474-481, <https://doi.org/10.1016/B978-0-12-822521-9.00009-5>.

[7]Chen, K., Wang, X., Song, H., 2015, Food safety regulatory systems in Europe and China: A study of how co-regulation can improve regulatory effectiveness, *Journal of Integrative Agriculture*, Vol. 14(11), 2203-2217, [https://doi.org/10.1016/S2095-3119\(15\)61113-3](https://doi.org/10.1016/S2095-3119(15)61113-3).

[8]Christian, M., Wibowo, S., Yulita, H., Melati, R., Sunarno, S., Titis, P. F., 2023, Two phases of online food delivery app users' behavior in Greater Jakarta during the second year of the Covid-19 pandemic: Perceptions of food safety and hygiene. *Environ. Health Eng. Manag.* Vol. 10(3), 249-259. <http://ehemj.com/article-1-1182-en.html>. DOI: 10.34172/EHEM.2023.28

[9]Divljak, D. L., 2022, Food safety standards and law of the World Trade Organization. *Zbornik radova Pravnog fakulteta, Novi Sad*, 56(4), 965-981. <https://doi.org/10.5937/zrpfns56-41276>

[10]Duru, S., 2023, Food Safety in Foreign Trade of Agricultural and Food Products: Evaluation of Risk Analysis Stages and Process. *Selcuk Journal of Agriculture and Food Sciences* Vol. 37(1), 185-195. DOI: 10.15316/SJAFS.2023.019

[11]European Union (EU), 2011, Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers. *OJ L 304*, 22.11.2011, pp. 18–63. <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:304:0018:0063:en:PDF>, Accessed on 12th Feb 2024.

[12]European Union (EU), 2017. Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products, (Official Controls Regulation). *OJ L 95*, 7.4.2017, p. 1–142 <https://eur-lex.europa.eu/eli/reg/2017/625/oj>, Accessed on 12th Feb 2024.

[13]Gopal, S., 2023, Survey on Ordering and Eating Food Using Online Food Delivery Applications. *International Journal For Multidisciplinary Research IJFMR* Vol. 5(4), DOI 10.36948/ijfmr.2023.v05i04.5607

- [14]Halim-Lim, S. A., Baharuddin, A. A., Cherrafi, A., Ilham, Z., Jamaludin, A. A., David, W., Sodhi, H. S., 2023, Digital innovations in the post-pandemic era towards safer and sustainable food operations: A mini-review. *Front. Food. Sci. Technol.* 2:1057652. doi: 10.3389/frfst.2022.1057652
- [15]Huang, Y., Wang, X., Wang, R., Min, J., 2022, Analysis and Recognition of Food Safety Problems in Online Ordering Based on Reviews Text Mining. *Wireless Communications and Mobile Computing* 2022(2):1-15. DOI: 10.1155/2022/4209732
- [16]Kirechev, D., Petev, A., 2021, Sustainability of the Food System - Contemporary Challenges and Problems for Bulgaria. *Izvestia Journal of the Union of Scientists -Varna, Economic Sciences Series, Vol.10(3)*, 185-193.
- [17]Kolaj, R., Borisov, P., Arabska, E., Radev, T., 2023, Food safety among and beyond: the power of market actors, institutions and researchers in the new era of food safety from farm-to-table. *Agricultural and Resource Economics: International Scientific E-Journal, Vol.9(2)*, 276–294. <https://doi.org/10.51599/are.2023.09.02.12>
- [18]Latip, M. S. A., Newaz, F. T., Mohamad, M. A., Tumin, S. A., Rahman, N. F. A., Noh, I., 2021, The Moderating Effect of Food Safety Knowledge on Organic Food Purchase Intention in a New Normal. *Pertanika J. Soc. Sci. & Hum.* Vol.29 (4), 2281 - 2299.
- [19]Lawal, M., Adzitey, F., 2022, Online ordering and delivery of ready-to-eat foods in Ghana: a call for policy towards ensuring food safety in the service. *J Food Safe & Hyg., Vol.8(3)*,144-155. DOI: 10.18502/jfsh.v8i3.11015
- [20]Liu, W., Du, H., Florkowski, W. J., 2023, Online Food Purchase Behavior: Covid-19 and Community Group Effect. *Journal of Theoretical and Applied Electronic Commerce Research, Vol. 18(3)*, 1529-1547. <https://doi.org/10.3390/jtaer18030077>
- [21]Lone, S., Weltevreden, J.W.J., 2023, 2023 European E-commerce Report. Amsterdam/Brussels: Amsterdam University of Applied Sciences & Commerce Europe, European E-commerce Report 2023. <https://www.upu.int/UPU/media/wwwUpuIntUniversalPostalUnionAboutUpuBodiesConsultativeCommittee/2023EuropeanEcommerceReportEn.pdf> Accessed on 12th Feb 2024.
- [22]Maganja, D., Davies, T., Sanavio, L., Louie, J. C. Y., Huffman, M. D., Trieu, K., Wu, J. H. Y., 2023, Current food labelling practices in online supermarkets in Australia. *Int J Behav Nutr Phys Act* 20, 105, <https://doi.org/10.1186/s12966-023-01504-3>
- [23]Mohamed, M., Patwary, A. K., 2021, Measuring Students' Awareness of Food Related Factors: The Role of Attitude, Price, Hygiene, and Food Safety. *Journal of Entrepreneurship and Business, Vol.9(2)*, 70–85. <https://doi.org/10.17687/jeb.v9i2.803>
- [23]Mulyanto, G., Kusumaningrum, H. D., Wulandari, N., 2023, Food safety knowledge and awareness among stakeholders of the online-food delivery system in Depok City Indonesia. *Food Research* Vol.7 (5), 29 – 41. DOI: 10.26656/fr.2017.7(5).881
- [24]Nakat, Z., Tayoun, V., Merhi, S., Bou-Mitri, C., Karam, L., 2023, Food safety culture in food companies amid the Lebanese economic crisis and the Covid-19 pandemic. *Heliyon* 9(9):e19885, DOI: 10.1016/j.heliyon.2023.e19885
- [25]Osaili, T. M., Al-Nabulsi, A. A., Al-Jaberi, T. M., 2022, Food safety knowledge, attitudes, and practices among female food handlers engaged in home-based online food businesses in Jordan during the Covid-19 pandemic. *Heliyon, Vol. 8(9)*, e10427. DOI:<https://doi.org/10.1016/j.heliyon.2022.e10427>
- [26]Osaili, T. M., Al-Nabulsi, A. A., Taybeh, A. O., Ismail, L. C., Saleh, S. T., 2023, Correction: Healthy food and determinants of food choice on online food delivery applications. *PLOS ONE Vol.18(12)*: 0296114. <https://doi.org/10.1371/journal.pone.0296114>
- [27]Pazil, A. H. M., Amran, N., Hussin, K. C., 2023, The Decision Factors in Online Food Delivery Services Selection during the Covid-19 Pandemic. *Journal of Entrepreneurship and Business, Vol.11(2)*, 45–55. <https://doi.org/10.17687/jeb.v11i2.936>
- [28]Pramezwary, A., Yulius, K. G., Viensa, V. P., & Pujangga, J. F., 2023, Factors driving generation Z's use of online food delivery service at the end of pandemic. *Jurnal Manajemen Perhotelan, Vol.9(2)*, 101-112. <https://doi.org/10.9744/jmp.9.2.101-112>
- [29]Septya, F., Andriani, Y., Yolanda, A. M., 2023, Online Food Marketing in Supporting Food Security Based on the Perspective of Urban Consumers in Riau Province. *Journal Pagan, Vol. 32(1)*.
- [30]Shen, C., Lei, B., Lu, C., Zhou, F., 2023, Research on the effectiveness of online food safety supervision under the existence of settled enterprises' myopic cognitive bias. *Heliyon Vol.9(1)*:e12784. DOI: 10.1016/j.heliyon.2022.e12784
- [31]Srinivasan, G., Prabu, M., Pandian, A. S. S., Varathan, B.J., 2020, Food safety knowledge, attitude and awareness among veterinary college students in India. *Journal of Entomolgy and Zoology Studies Vol.8(6)*,1707-1711.
- [32]Thor, E. P., Lafarga, V. O., 2016, Food Safety and Food Security in the CANAMEX Trade Corridor. *Food Security in a Food Abundant World, Frontiers of Economics and Globalization, Vol. 16*, Emerald Group Publishing Ltd, Leeds, pp. 133-144. <https://doi.org/10.1108/S1574-871520150000016011>
- [33]Tomasevic, I., Hambardzumyan, G., Marmaryan, G., Nikolic, A., Mujcinovic, A., Sun, W., Liu, X. C., Kovačević, D. B., Markovinović, A. B., Terjung, N., Heinz, V., Papageorgiou, M., Skendi, A., Goel, G., Raghav, M., Zotte, A. D., Nakov, D., Velkoska, V., Sołowiej, B. G., Semenova, A. A., Kuznetsova, O. A., Krocko, M., Duckova, V., Lorenzo, J. M., Echegaray, N., Oz, E., Oz, F., Djekic, I., 2023, Eurasian consumers' food safety beliefs and trust issues in the age of Covid-19: evidence from an online survey in 15 countries. *Journal of the Science of Food and Agriculture* 103(15). <https://doi.org/10.1002/jsfa.12815>

[34]Vågsholm, I., Arzoomand, N.S., Boqvist, S., 2020, Food Security, Safety, and Sustainability—Getting the Trade-Offs Right. *Front. Sustain. Food Syst.* 4:16. doi: 10.3389/fsufs.2020.00016

[35]Wilcock, A., Boys, K. A., Ball, B., 2023, The effects of consumer perception of food safety and quality in food purchase decisions. In book: *Consumers and food: Understanding and shaping consumer behavior*. Burleigh Dodds Series in Agricultural Science, UK.

[35]Yılmaz, S., Dölekoğlu, C., Yılmaz, İ., Gümüş, E., Akat, A., Şen Şensoy, E.B., 2023, Perception of Food Safety in Fish Consumption: The Case of Antalya Province. *Int J Agric For Life Sci* (2023) Vol.7(1), 20-24

[36]Yolanda, A. M., Septya, F., Andriani, Y., 2023, Effect customer behaviour in online food purchasing on customer perceptions of the existence of online food marketing for sustainable food security in Pekanbaru municipality. *E3S Web of Conferences* 373, 04009. <https://doi.org/10.1051/e3sconf/202337304009>

[37]You, Z., Zhan, W., Zhang, F., 2023, Online information acquisition affects food risk prevention behaviours: the roles of topic concern, information credibility and risk perception. *BMC Public Health* **23**, 1899. <https://doi.org/10.1186/s12889-023-16814-1>

[38]Zuo, E., Aysa, A., Muhammat, M., Zhao, Y., Chen, B., Ubul, K., 2022, A food safety prescreening method with domain-specific information using online reviews. *J Consum Prot Food Saf* **17**, 163–175. <https://doi.org/10.1007/s00003-022-01367-z>

