



Food safety, consumer trust and emerging trends

Nedjeljko Karabasil^{1*} , Tamara Bošković², Mirjana Dimitrijević¹ , Ivan Vičić¹ , Nikola Čobanović¹ ,
Nevena Grković¹  and Nataša Kilibarda³ 

¹ University of Belgrade, Faculty of Veterinary medicine, Department of Food Hygiene and Technology, Belgrade, Serbia

² Ministry of Agriculture, Forestry and Water Management, Veterinary Directorate, Belgrade, Serbia

³ University Singidunum, Belgrade, Serbia

ARTICLE INFO

Keywords:

Global
Safety
Security
Reactive
Proactive

ABSTRACT

The complexity of today's global food industry demands robust food safety systems that go beyond technical solutions. Sustainable production, advanced technologies, and circular economy principles are essential to meet the needs of a growing population. Despite regulatory controls, incidents of contamination persist, impacting consumer trust as a key foundation of food safety. Modern food safety systems must address both accidental and intentional risks, including food fraud, through transparent communication and proactive management. Establishing a strong food safety culture, with leadership and risk awareness, is crucial for transitioning from reactive to proactive systems. Ultimately, integrated approaches and stakeholder engagement are vital for building resilient, trustworthy, and sustainable food systems.

1. Introduction

The growing food industry and its complexity have intensified its significance due to the need for a robust and trusted global food system and food safety mechanisms. These mechanisms have to extend beyond the technical solutions in the area of food production, processing, distribution, and consumption (Vågsholm *et al.*, 2020). As the world population grows, feeding the global population requires a sustainable approach, with reducing food loss, new and sophisticated technologies, introducing circular economy, with improved effectiveness and efficiency, and taking care of the environment (Singh, 2025; Kilibarda *et al.*, 2023). Food production depends on numerous factors, including weather conditions, geopolitical situations, as well as supply and demand

on the market (FAO, 2025). Food security requires proactive decision-making with improved food safety and innovation in production and distribution to achieve a secure system (Chandimali *et al.*, 2025; Karabasil *et al.*, 2023).

This article explores recent advances in food safety and food safety culture assessment, and the evolution of consumer trust.

2. Food systems and safety

Food used to be produced and sold locally. The journey from the producer to the consumer was short, and raw materials for production were used from the local area. Today, the situation is different. Food systems are complex, raw materials are procured from different geographical latitudes and distances, and

*Corresponding author: Nedjeljko Karabasil, nedja@vet.bg.ac.rs

Paper received September 10th 2025. Paper accepted September 15th 2025.

The paper was presented at the 63rd International Meat Industry Conference “Food for Thought: Innovations in Food and Nutrition” – Zlatibor, October 05th–08th 2025.

Published by Institute of Meat Hygiene and Technology – Belgrade, Serbia.

This is an open access article CC BY licence (<http://creativecommons.org/licenses/by/4.0>)

the product is often a complex mixture of them with appropriate technological processing (Aybar Espinoza et al., 2026). Nowadays, it is quite rare to sell food from the doorstep, but distributors and wholesale and retail networks are involved in the process. This situation further complicates the food production chain, and therefore, a proactive approach to risk control must be taken. The risks are numerous, and there is practically no point in the production chain where possible contamination cannot occur (Zahir et al., 2025; Yeak et al., 2025). Today, more and more food is placed and sold on the international market, and therefore, the number of links that make up the chain of production, distribution, and consumption is becoming longer and more complex (Grabs & Carodenuto, 2021). In general, consumers have a greater preference for local or domestic products compared to products from the global market. This consumer attitude is more of a habit than an element consistent with assessed risk or a record of proven risk (Polleau & Biermann, 2021). There are several reasons that affect market stability and consumer confidence, including foodborne disease agents, increasingly recorded chemical food contaminants, transboundary diseases, intentional food contamination, and food fraud. Although regulatory and process control requirements are constantly being improved, there are still incidents related to risks in the food and food production chain, such as Salmonella, residues of antimicrobial drugs, pesticides, metal fragments, etc (Aybar Espinoza et al., 2026; Karabasil et al., 2025; Karabasil et al., 2021).

Nowadays, the demands of the consumers are getting more prominent and are realized through different levels. Entities in the food business want to cope with it and keep the trust of consumers, as a foundation of food safety. The consumer will forgive an error and incidents that occurs during the process of production, storage, and distribution, but only in case they received clear and transparent information regarding the product and the further procedure (Gannon et al., 2022). In order to fulfil the requirements of the legislator and the requirements of the market and ensure a sufficient amount of safe and nutritional food for the population's diet, producers must follow and introduce in the system new and sophisticated technologies that require additional resources in the competitive market (Chandimali et al., 2025; Harnessing, 2025).

3. Food control

If there is no safe food, we cannot have secure food. Food safety is based on several levels of control: application of legal requirements, application of the rules of good hygiene practice and good production practice, principles of HACCP, verification, and official control (Radu et al., 2023). We are aware that the food sector is a sector that operates with risks. The risks are numerous, and according to the risk assessment and analysis by the regulatory body and food business operators, they must be eliminated or kept under control with application of adequate measures. However, we witness that incidents occur, and control fails to prevent microbiological, chemical, or physical contamination (Zahir et al., 2025; Yeak et al., 2025). These situations undermine consumer confidence, which is the foundation of food safety. In the 21st century, in addition to food safety, which primarily deals with the prevention of accidental contamination in the food chain, food systems must take care of the prevention of intentional contamination and food defence, as well as food fraud (Neuberger et al., 2025; Marin et al., 2025; Davidson et al., 2017). In order to keep all these challenges under control, regulatory authorities and food systems must develop and implement management systems based on constant monitoring and control of critical parameters along the entire chain of production, distribution, and consumption (Manning, 2020). Control systems have to use modern technology, which implies the use of information technologies, including artificial intelligence (Harnessing, 2025).

In order to enable sustainable production, distribution, consumption and improve awareness of food safety principles, nowadays we are talking about a food safety culture that contains collective values and rules in one system (Tongyu Wu & Wallace, 2025). Key elements of a food safety culture are leadership, communication, risk, and environmental awareness. Leadership and adequate communication in a system that operates with risk, such as the food industry, are key proactive components that drive the system and create such an internal environment where employees, through compliance with established procedures, ensure the integrity of the process from a reactive to a proactive system (Manning, 2020).

4. Consumer trust

The history of consumer trust in food production systems includes global connectivity and a complex network that has an impact on consumer expectations and includes a demand for transparent and traceable information that has an impact on consumer attitudes and product placement (Anastasiadis *et al.*, 2022). The integrity of the chain of food production, distribution and consumption is often affected by incidents as a result of failure, change of food properties, evident finding of biological, chemical, or physical risk. Although not all recorded incidents represent a direct health hazard, each recorded incident affects consumer confidence and the integrity of the food chain (Vainio *et al.*, 2020). Therefore, the responsibility of the food chain lies in the corresponding transparency and traceability. The improvement of this aspect includes numerous parameters such as sustainability of the agricultural production chain, origin of raw materials and products, composition and properties of products, processing and used technology, supply chain, regulatory requirements, awareness, and responsibility of consumers. The fact is that the expected growth trend of the world's population by 2050 is expect-

ed to reach 10 billion people, which creates enormous pressure on food systems to place a sufficient amount of safe food on the market (FAO, 2025; Roy, 2024). In order to achieve this, food production must be significantly increased, which can represent a significant obstacle for the food system, if it does not transition in the coming years to sustainable production systems with the best possible utilization of raw materials with minimal waste while preserving the environment. Modern consumers' expectations are very closely related with the sustainable and responsible production with care for our planet and keeping resources for next generations (Karabasil *et al.*, 2023; Jiang *et al.*, 2021).

5. Conclusion

Food safety is multidimensional and complex, and influences both organisational effectiveness and the confidence of consumers. Technological innovations offer powerful tools for risk mitigations, but their success depends on stakeholder engagement and as well as other sectors. Only an integrated, holistic approach will enable food systems to achieve a compact and resilient state with an important element of consumer trust.

Disclosure Statement: No potential conflict of interest was reported by the authors.

Author Contributions: Conceptualization, NKA, and NKi; writing—original draft preparation, NKA, and NKi; writing—review and editing, TB, MD, IV, NČ, NG; supervision, NKA;

Funding: This study was supported by the Science Fund of the Republic of Serbia, Grant No. 7042, Tracking antimicrobial resistance in diverse ecological niches - one health perspective- TRACE; by the Science Fund of the Republic of Serbia, Grant No 14868, Mild Technology in meat processing for sustainable diet, MEAT; and by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Contract number 451-03-136/2025-03/200143).

References

- Anastasiadis, F., Manikas, I., Apostolidou, I., & Wahbeh, S. (2022). The role of traceability in end-to-end circular agri-food supply chains. *Industrial Marketing Management*, 104(May), 196–211. <https://doi.org/10.1016/j.indmarman.2022.04.021>
- Aybar Espinoza, M. S., Kasbohrer, A., Wagner, M., van der Fels-Klerx, H. J., Uyttendaele, M., & Gottschald, M. (2026). From farm to fork: Examining the differences between local and global food supply chains. *Food Control* 179, 111531. <https://doi.org/10.1016/j.foodcont.2025.111531>
- Chandimali, N., Bae J., Hwang, J. Y., Bak, S. G., Cheong, S. H., & Lee, S. J. (2025). Integrated Hygiene Control Strategies in Food Manufacturing: Technologies, Regulations, and Socioeconomic Impacts. *Journal of Food Protection*, 88(7), 100547. <https://doi.org/10.1016/j.jfp.2025.100547>
- Davidson, R., Antunes, W., Madslie, E., Belenguer, J., Ger-evini, M., Perez, T. T., & Prugger, R. (2017). From food defence to food supply chain integrity. *British Food Journal*, 119(1), 52–66. <https://doi.org/10.1108/BFJ-04-2016-0138>
- de Vries, H., Axelos, M., Sarni-Manchado, P., & O'Donohue, M. (2018). Meeting new challenges in food science technology: The development of complex system approach for food and biobased research. *Innovative Food Science &*

- Emerging Technologies*, 46, 1-6. <https://doi.org/10.1016/j.ifset.2018.04.004>
- FAO, (2025).** Food Outlook: Biannual report on global food markets. Food and Agriculture organisation of the United nations. <https://doi.org/10.4060/cd5655en>
- Gannon, M., Taheri, B., Thompson, J., Rahimi, R., & Okumus, B., (2022).** Investigating the effects of service recovery strategies on consumer forgiveness and post trust in the food delivery sector. *International Journal of Hospitality Management*, 107, 103341. <https://doi.org/10.1016/j.ijhm.2022.103341>
- Grabs, J., & Carodenuto, S. L. (2021).** Traders as sustainability governance actors in global food supply chains: A research agenda. *Business Strategy and the Environment*, 30(2), 1314–1332.
- Jiang, S., Wang, F., Li, Q., Sun, H., Wang, H., & Yao, Z. (2021).** Environment and food safety: a novel integrative review. *Environment Science and Pollution Research*, 28, 54511–54530. <https://doi.org/10.1007/s11356-021-16069-6>
- Karabasil, N., (2021).** Pork Safety – challenges and opportunities. 61st International Meat Industry Conference, IOP Conf. Series: Earth and Environmental Science 854 (2021) 012043. doi:10.1088/1755-1315/854/1/012043
- Karabasil, N., Bošković, T., Kilibarda, N., Čobanović, N., Vičić, I., & Dimitrijević, M. (2023).** Sustainable meat production. *Meat Technology*, 64(2), 133–135. <https://doi.org/10.18485/meattech.2023.64.2.23>
- Karabasil, N., Mirković, M., Vičić, I., Perić, I., Zlatković, N., Luković, B., & Gajić, I. (2025).** Antimicrobial Resistance in Diverse Ecological Niches—One Health Perspective and Food Safety. *Antibiotics*, 14, 443. <https://doi.org/10.3390/antibiotics14050443>
- Kilibarda, N., Karabasil, N., & Stojanović, J. (2023).** Meat Matters: Tackling Food Loss and Waste in the Meat Sector. *Meat Technology*, 64(2), 177–182. <https://doi.org/10.18485/meattech.2023.64.2.32>
- Manning, L. (2020).** Moving from compliance – based to an integrity – based organizational climate in the food supply chain. *Comprehensive Reviews in Food Science and Food Safety*, 19, 995–1017. <https://doi.org/10.1111/1541-4337.12548>
- Marin, X., Grau-Noguer, E., Gervilla-Cantero, G., Ripolles-Avila, C., & Castillo, M. (2025).** Emerging technologies for detecting food fraud: A review of the current landscape in the 2020s. *Trends in Food Science & Technology*, 165, 105313. <https://doi.org/10.1016/j.tifs.2025.105313>
- Neuberger, S., Benson, T., Wepner, B., Hommes, N., van der Fels-Klerx, H. J. (2025).** A co-creation approach to identify drivers and indicators for emerging food safety risks in a changing food system. *Journal of Agriculture and Food Research*, 102463. <https://doi.org/10.1016/j.jafr.2025.102463>
- Polleau, A., & Biermann, G. (2021).** Eat local to save the planet? Contrasting scientific evidence and consumers' perceptions of healthy and environmentally friendly diets. *Current Research in Environmental Sustainability*, 3, Article 100054.
- Radu, E., Dima, A., Dobrota, M. E., Badea, A. M., Madsen, D. O., Dobrin, C., & Stanciu S. (2023).** Global trends and research hotspots on HACCP and modern quality management systems in the food industry. *Heliyon*, 9(7), e18232. <https://doi.org/10.1016/j.heliyon.2023.e18232>
- Roy, A., Maradkhani, H., Mekonnen, M., Moftakhari, & Magliocca, N. (2024).** Towards strategic interventions for global food security in 2050. *Science of the Total Environment*, 954, 176811. <https://doi.org/10.1016/j.scitotenv.2024.176811>
- Singh, D. (2025).** Harnessing Artificial Intelligence to Safeguard Food Quality and Safety. *Journal of Food Protection*, 88(11), 100621. doi: <https://doi.org/10.1016/j.jfp.2025.100621>
- Singh, D., & Harnessing (2025).** Artificial Intelligence to Safeguard Food Quality and Safety. *Journal of Food Protection*. <https://doi.org/10.1016/j.jfp.2025.100621>
- Tongyu, Wu, S., & Wallace, A. C. (2025).** Food safety culture contributory factors in foodborne illness recalls and outbreaks, 2001–2022. *Trends in Food Science & Technology*, 163, September 2025, 105132. <https://doi.org/10.1016/j.tifs.2025.105132>
- Vagsholm, I., Arzoomand, S. N., & Boquist, S. (2020).** Food Security, Safety, and Sustainability – Getting the Trade-Offs Rights. *Frontiers in Sustainable Food Systems*, 4, Article 16. <https://doi.org/10.3389/fsufs.2020.00016>
- Vainio, A., Kaskela, J., Finell, E., Ollila, S., & Lunden, J. (2020).** Consumer perceptions raised by the food safety inspection report: Does the smiley communicate a food safety risk? *Food Control*, 110, April 2020, 106976. doi: <https://doi.org/10.1016/j.foodcont.2019.106976>
- Yeak, K. Y. C., Thomopoulos, R., Palmont, P., Rivière, G., den Besten, H. M. W., Zwietering, M. H., & Membre, J. M. (2025).** Microbiological and chemical risks in foods: Public perception versus risk ranking. *Food Research International*, 221, Part 4, 117586. <https://doi.org/10.1016/j.foodres.2025.117586>
- Zahir, A., Ge, Z., & Ali Khan, I. (2025).** Public Health Risks Associated with Food Process Contaminants – A Review. *Journal of Food Protection*, 88(2), 100426. <https://doi.org/10.1016/j.jfp.2024.100426>

Authors info

Nedeljko Karabasil, <https://orcid.org/0000-0001-6097-3216>

Tamara Bošković /

Mirjana Dimitrijević, <https://orcid.org/0000-0003-1670-6481>

Ivan Vičić, <https://orcid.org/0000-0001-8762-2811>

Nikola Čobanović, <https://orcid.org/0000-0003-2650-6272>

Nevena Grković, <https://orcid.org/0000-0002-0205-3531>

Nataša Kilibarda, <https://orcid.org/0000-0002-2967-3749>