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Editorial: Ensuring food safety and quality throughout the supply chain

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Editorial on the Research Topic
Ensuring food safety and quality throughout the supply chain

Background

Crop diseases pose a constant threat to agricultural production as these can cause significant yield losses and impact food quality. In the past decades, chemical agents such as pesticides have been extensively and repeatedly used, causing many environmental and public health concerns and led to the development of pathogens persistence. On the other hand, after the harvest period, Ensuring food safety and quality throughout the supply chain is also essential. Contamination, improper handling, and inadequate storage and transportation practices can lead to foodborne illnesses and impact consumer confidence.

Managing diseases sustainably while minimizing reliance on chemical agents is a critical but pivotal challenge to ensure food security and sustainable agriculture production.

Sustainable solutions have been found in agents derived from natural sources considered environmentally friendly alternatives to chemical agents, used for controlling diseases and promoting plant growth. Commonly used biological agents in the agri-food field can be divided into two types: living and non-living agents. Living agents include antagonistic microorganisms like bacteria, fungi, and viruses (bacteriophage). Non-living agents include essential oils, plant extracts, plant compounds (like thymol and carvacrol, etc), enzymes, insect pheromones, and RNA interference.

These gaps primarily pertain to the insufficient knowledge surrounding emerging pathogens or novel diseases that impact agriculture and livestock, resulting in substantial economic losses and posing challenges to food safety. Investigating the various elements that contribute to the occurrence and dissemination of these diseases, as well as formulating efficacious measures for prevention and control, would be of great significance in addressing this existing research deficiency.

Outcome

Within this Research Topic, we have received an excellent collection of articles (15 articles) that cover multiple aspects. The common themes of these articles are adopting the One Health approach to tackle foodborne pathogens and AMR at the animal–human–environment interface and provide evidence-based understanding and complemented the knowledge on available and emerging strategies and technologies to holistically address risk assessment, food safety and public health along the food production chain. Here, we provide a brief commentary on some of the work that has been presented under different aspects outlined in our Research Topic.

Tesfaye et al. examined the prevalence of *Aspergillus* species in three types of feed collected from specialized dairy farms and local markets in three cities in eastern Ethiopia. A total of 180 dairy feed samples were collected and analyzed based on cultural and microscopic characteristics. Additionally, the aflatoxigenic potential of the colonies was tested. Therefore, this study highlights the urgent need for stringent measures in feed quality control to curb its prevalence and the risk of aflatoxin exposure.

Owusu et al. explored the levels of coliform contamination, prevalence of antibiotic-resistant bacteria, and the hygienic practices in goat meat retail stores. The study's findings reveal heightened levels of coliform contamination, the presence of pathogenic and multidrug-resistant bacteria in goat meat, and suboptimal meat handling practices in retail stores. The significance of improving food safety practices in retail settings is emphasized to ensure the safety of goat meat, a matter of increasing importance due to its growing demand globally.

Goodwyn et al. have analyzed the survival and pathogenesis of three foodborne pathogens and indicator bacteria in Biological Soil Amendments Of Animal Origin (BSAAO)-amended soils for their potential to transfer and produce harvested from three organic, integrated crop-livestock farms (ICLFs). The results of this study indicated pathogens associated with BSAAOs (contaminated manures/composts) can persist after soil incorporation and transfer to harvestable produce grown on ICLF's on the.

Keba, Girmay et al. evaluated the microbial quality and safety of milk and cottage cheese and spatial distribution of microbial quality indicators and foodborne pathogens along the dairy value chain in the three regions of the country. This study offers some insight into the importance of food traceability to prevent food safety threats along the dairy value chain and intervention areas.

Kuboka et al. analyzed stakeholder perceptions of food safety in selected informal public markets in Kenya. Eight focus group discussions and 15 key informant interviews were conducted. In addition, two workshops were held to validate the findings. This study has highlighted gaps and misperceptions that need to be addressed through proper knowledge and awareness to effectively combat foodborne disease challenges. Behavioral change approaches to improve food safety are recommended.

Shen et al. examined the implications of an aging agricultural workforce on the use of biopesticides in China and the effects of outsourced pest management services. As a results, the authors suggest providing further support to older farmers and integrating outsourcing services into green control policies to improve sustainable agriculture.

Taibi et al. investigated the green biosynthesis of silver nanoparticles (AgNPs) from the marine alga *Ulva lactuca* L. and their antifungal and antimicrobial potential for agricultural and environmental applications. This study demonstrates that the nanoparticles can be used as an environmentally friendly alternative to chemical pesticides.

Baghouz et al. studied the insecticidal activity of essential oils (EOs) from *Ziziphora hispanica* L. and *Satureja calamintha* L. on the cowpea seed pest *Callosobruchus maculatus* to offer alternative green strategies to protect stored seeds. The authors concluded that these EOs are a promising source of botanical bioinsecticides for sustainable pest management of beans or legumes under conditions of seed storage and grain handling.

Pajoro et al. conducted a systematic review evaluating the effects of farming systems (intensive, extensive, conventional, organic) on infectious agents and antimicrobial resistance (AMR) in dairy cattle. The authors concluded that there are no farming systems that have a significantly greater advantage over another in term of limiting the circulation of infectious agents, while organic livestock farming appears to have lower AMR in certain cases.

Keba, Tola et al. studied the effect of training on hygienic milk production for 120 women farmers in the central highlands of Ethiopia. The training program aimed at enhancing the women's knowledge, attitudes, and practices (KAPs) regarding hygienic milk. Nevertheless, the field evaluations highlighted major infrastructure constraints (lack of clean water, inadequate equipment, poor personal hygiene) which contributed to a failure to apply good practice.

Study conducted by Baikadamova et al. in Shakarim University to create and implement a HACCP plan for the meat pâté "Phirmennyi" at the "Alteev" meat processing company in Semey, Kazakhstan. The area poses particular environmental food safety challenges because it is close to the former Semipalatinsk Nuclear Test Site. The findings show that in environmentally impacted places, a structured HACCP system can greatly improve food safety and quality, offering a reproducible model for comparable situations.

Cao et al. investigated the disparity between Chinese consumers' interest in and actual use of organic food, despite rising income levels and awareness of food quality. The stimulus-organism-response (SOR) model is used to incorporate perceived values, innovation resistance, and trust in order to examine the relationship between food safety concerns and organic purchasing. The findings offer practical suggestions for bridging the gap between intention and behavior and promoting the use of organic foods.

Song et al.'s study focusses on evaluating the risks to food safety in alcoholic beverages. Because of issues with methanol, chemical adulterants, additives, and microbiological contamination, this business requires stringent regulation. Using data from China's National Food Safety Sampling Inspection Results, the researchers propose a multi-weight decision model based on deviation reconstruction that is optimized with the NSGA-II algorithm and employs three weighting strategies. In order to increase public trust and guide legislative reforms for long-term, sustainable sector

growth, the results suggest that food safety management should adopt a proactive rather than a passive strategy.

Boișteanu et al. evaluated the concentrations of heavy metals and vital minerals in the kidney and muscle tissues of wild boars that were killed in northeastern Romania during the previous 10 years. Age and sex had a substantial impact on mineral concentrations, especially those of Fe, Cu, Zn, and Mg, according to the data. This analysis, which is the first of its kind in Romania, highlights how urgently frequent monitoring and mitigation measures are needed to guarantee the safety of game meat.

Xu et al. examined the application of a blockchain-based system to improve cold chain logistics for the high-value agricultural product Gannan navel oranges. Conventional logistics systems have security flaws, inadequate data sharing, and little transparency, which results in inefficiencies and financial losses. The outcomes demonstrated improved logistics coordination, higher-quality services, and lower operating expenses. Strong application potential for the system was also shown in the management of other high-value agricultural supply chains around the world.

In conclusion, in our Research Topic, we have provided comprehensive, reliable, and updated information on the current state of knowledge and research in the field of food safety. Our goal is to inspire future researchers to pursue these important areas of study, with the hope that their work will lead to promising and innovative directions for the future. The publication of "Ensuring food safety and quality throughout the supply chain" seeks to contribute to this effort.

Author contributions

HS: Writing – original draft, Writing – review & editing. HI: Writing – review & editing. FJ: Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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