



FOOD SAFETY IN UZBEKISTAN AND BEYOND: CHALLENGES, SYSTEMS, AND GLOBAL STANDARDS

Rakhmankulov Akmal Berdikulovich

Academy of Armed Forces of the Republic of Uzbekistan.

<https://doi.org/10.5281/zenodo.16742462>

ARTICLE INFO

Received: 25th July 2025

Accepted: 30th July 2025

Online: 31st July 2025

KEYWORDS

Food safety; HACCP; risk-analysis; Codex Alimentarius; WTO SPS; ISO 22000; Uzbekistan; laboratory accreditation; public health; foodborne illness

ABSTRACT

Food safety is a critical public health and economic concern globally. In Uzbekistan, recent legislative reforms, institutional restructuring, and capacity-building efforts aim to align with Codex Alimentarius, HACCP, ISO standards, and WTO SPS measures. This article presents (i) conceptual frameworks and risk-based management systems, (ii) Uzbekistan's ongoing reforms—including new food safety law, laboratory upgrades, and FAO/ITC projects—and (iii) global strategies for hazard control. Finally, recommendations are offered on enhancing collaboration between public authorities, private sector and academia to ensure safe and sustainable food supply chains.

1. Introduction

Food safety refers to ensuring food is free from biological, chemical, and physical hazards at all stages from production to consumption. Ensuring this safety is essential to human health, economic development, and trade. Globally, the WHO estimates that some 600 million people fall ill annually due to unsafe food, causing approximately 420,000 deaths, many among children under five years of age.

In Uzbekistan, improvements in food safety control systems are underway. An ambitious legislative framework is emerging, laboratories are being consolidated and upgraded to international standards, and training programs are being deployed, all to support public health and facilitate international trade.

2. Conceptual Frameworks: Risk Analysis, Codex, HACCP, ISO

2.1 Codex Alimentarius and WTO SPS

The Codex Alimentarius provides internationally recognized standards for food hygiene, labeling, pesticide residues, contaminants, and analytical methods. It also recommends HACCP implementation and traceability systems. Under the World Trade Organization's Agreement on Sanitary and Phytosanitary Measures (SPS), countries must ensure their sanitary and food safety measures are science-based and do not create unnecessary trade barriers. Uzbekistan's reform of its food legislation aims to align its system with SPS rules to boost trade and consumer protection.

2.2 Risk Analysis and HACCP

Risk analysis, as defined by Codex, comprises risk assessment, risk management, and risk communication. HACCP (Hazard Analysis and Critical Control Point) offers a systematic



preventive approach to identifying and controlling food safety hazards—biological, chemical, or physical—from farm to fork. Originating from NASA food production protocols, HACCP is now mandatory in many jurisdictions for sectors such as meat and juice, while voluntary under ISO 22000 frameworks.

2.3 ISO 22000

ISO 22000 provides a voluntary international standard for food safety management systems that integrate HACCP principles and risk-based preventive controls. It is increasingly adopted by developing countries to enhance market access—Uzbek producers aiming to export will benefit from aligning with ISO 22000 in addition to national HACCP requirements.

3. Uzbekistan's Food Safety Reform Landscape

3.1 Legislative Update: New Food Safety Law

In March–April 2025, Uzbekistan's parliament approved in first reading a draft Food Safety Law (with 6 chapters and 47 articles) tailored to align with WTO SPS rules and Codex guidelines. It defines the responsibilities of state bodies, implements risk-based systems including HACCP, and mandates uniform hygiene and control measures across the food supply chain.

Notably, the law calls for consumption standards to be reviewed every three years, with oversight by the Cabinet of Ministers and the Ministry of Agriculture as lead authority.

3.2 Institutional and Laboratory Capacity Building

With support from ITC and EU WTO-accession projects, Uzbekistan is restructuring its food safety testing network. In mid-2024 a survey identified key labs that were upgraded to meet ISO/IEC 17025:2017 standards. In October 2024, field assessments were conducted, and subsequently 37 technicians were trained in record-keeping, methods validation, sampling, and analysis for microbiological, pesticide, and aflatoxin testing.

FAO-supported projects launched in April 2025 undertook assessments of Uzbekistan's food control system and strategic planning workshops. Outcomes include recommendations for modernizing institutional frameworks, improving inspection protocols, and designing national food safety strategies and action plans.

3.3 Public Health Incidents and Enforcement

In the first five months of 2025, Uzbekistan reported 14 food poisoning incidents affecting 42 individuals, including multiple cases of botulism from home-canned preserves and chemical contamination. Inspections of catering establishments found hygiene violations in over 3 % of inspected sites. These incidents underscore the need for stronger regulatory enforcement, public awareness, and improved food handling practices across informal sectors.

4. Core Components of an Effective Food Safety System

4.1 Integrated Policy and Oversight Across Agencies

Strong food safety systems rely on clear legislative frameworks, enforcement protocols, and coordination among agencies—public health, agriculture, consumer protection, and trade. Uzbekistan's new law unifies authority and clarifies roles, enabling a risk-based and harmonized approach across sectors.

4.2 Capacity Building: Laboratories and Personnel

Accredited laboratories compliant with ISO/IEC 17025 and auditors trained in HACCP protocols are critical. Uzbekistan's investment in selecting and upgrading key labs, along with



specialized training of technicians, positions the country to implement science-based testing and risk assessment systemically.

4.3 Implementation of HACCP and ISO Systems

Implementing HACCP at food processing facilities—including mapping hazard points, establishing critical control points, and record-keeping—is a fundamental preventive tool. Workshops organized with support from GIZ and vocational partners in Uzbekistan have trained industry and academic personnel in HACCP principles and Preliminary Conditions Programs.

4.4 Monitoring and Surveillance

Continuous monitoring of foodborne illness and contamination events allows regulators to react quickly and adjust safety controls. Globally, innovative methods including machine-learning models (like FINDER) are used to detect outbreaks in near real time. In Uzbekistan, routine inspections of public catering and documentation of poisoning incidents support hazard monitoring.

4.5 Risk Communication and Consumer Engagement

Education of food businesses and consumers about safe food practices—clean water, cooking temperatures, avoidance of contaminated locally produced goods—is key. Public advisories on home-canning safety, sanitary handling of fruit and vegetables, and water treatment can reduce incidents of botulism or diarrhea.

5. Global Best Practices and Emerging Technologies

5.1 Tech-Enabled Inspection and Surveillance

Machine-learning applications such as FINDER use anonymized web search and mobility data to flag potential foodborne illness hotspots, enabling targeted inspection and prevention efforts.

5.2 Role of AI and LLMs in HACCP

Recent academic work explores how large language models could assist in designing HACCP plans, risk assessment tools, and dynamic response protocols—particularly for pathogens like *Campylobacter*—in food supply chains.

5.3 International Standards for Improved Trade Access

Aligning with ISO 22000 and HACCP simplifies market access for exporters. Many countries now require ISO certification or equivalent risk-based controls to ensure compliance and consumer trust.

6. Discussion and Recommendations

6.1 Strengthen Enforcement and Inspection

Increasing inspection coverage of public catering—from under 8 % toward broader coverage—and imposing sanctions for hygiene violations can reduce risks in informal food sectors.

6.2 Expand Lab Accreditation and Decentralization

While three main laboratories are prioritized for ISO/IEC 17025 accreditation, expanding capacity across regions will reduce duplication and enhance coverage, especially in remote areas, as envisioned under ongoing restructuring efforts

6.3 Promote HACCP and ISO Certification Among Producers



Encouraging small and medium enterprises to adopt HACCP or ISO 22000 through public-private partnerships, incentives, or technical support could accelerate safe production practices and export readiness.

6.4 Leverage Data-Driven Surveillance Tools

Adoption of digital surveillance tools, complaint hotlines, or even machine-learning analytics could enhance detection of outbreaks and support proactive interventions.

6.5 Educate Consumers and Food Handlers

Public education campaigns addressing risks of unsafe home preservation, contamination via poor hygiene, and proper storage and cooking practices can greatly reduce incidents of foodborne illness.

7. Conclusion

Effective food safety systems are foundational to public trust, health, and economic development. Uzbekistan's legislative reforms, inter-agency coordination, laboratory upgrades, and capacity-building activities mark substantial progress toward meeting global standards. Continued investment in surveillance, training, and engagement across the supply chain will sustain these gains. Embracing emerging technologies and aligning with international norms like Codex, HACCP, ISO 22000, and WTO SPS can not only protect domestic health but also boost Uzbekistan's competitiveness in global markets.

References:

1. Kun.uz (25 June 2025). "Food safety concerns rise in Uzbekistan with 14 poisoning incidents over five months" [Kun.uz](#)
2. FAO (8 April 2025). "Uzbekistan Launches New Project to Strengthen Food Safety" [FAOHome+1](#)
3. ITC/EU project announcement (28 April 2025). "Ambitious plan to restructure Uzbek food safety for WTO" [intracen.org](#)
4. UzDaily.com (3 April 2025). "Uzbekistan approves food safety bill in first reading" [UzDaily](#)
5. Kun.uz (5 Feb 2025). "Consumption standards to be reviewed on a three-year basis" [Kun.uz](#)
6. Wikipedia (2025-06). "Food safety-risk analysis" [Википедия](#)
7. Wikipedia (2025-07). "Hazard Analysis Critical Control Point" [Википедия](#)
8. Wikipedia (2025-05). "ISO 22000" [Википедия](#)
9. Wikipedia (2025-07). "Codex Alimentarius" [Википедия](#)
10. Shirin Fayziyeva et al. (2023). "Ensuring food safety in Uzbekistan and its forecasting" [bio-conferences.org](#)
11. Nizamov et al. (2023). "Priority areas of ensuring food safety in Uzbekistan" [jazindia.com](#)
12. Boyquzieva G. A. (2022). "Improving food safety mechanisms in Uzbekistan" [Scholar Express](#)
13. Sadilek et al. (2018). "Machine-learned epidemiology: real-time detection of foodborne illness at scale" [arxiv.org](#)