

## Cultivating collaboration and innovation in food safety: outcomes of the “2<sup>nd</sup> EU Food Safety Forum”

VMT Lattanzio<sup>1</sup>, M Loi<sup>1</sup>, NM Cito<sup>1</sup>, N Belc<sup>2</sup>, B Ciasca<sup>1</sup>, M Eskola<sup>3</sup>, MF Iulietto<sup>4</sup>, PA Luning<sup>5</sup>, D Steiner<sup>6</sup>, M Tomanoiva<sup>7</sup>, and A Moretti<sup>1</sup>

<sup>1</sup>Institute of Sciences of Food Production, National Research Council of Italy, Via Amendola 122/O, 70126 Bari, Italy

<sup>2</sup>IBA Bucharest, 5th Ancuța Băneasa Str., 2nd district 020323, Bucharest, Romania

<sup>3</sup>MEDFILES Volttikatu 5, FI-70700 Kuopio, Finland

<sup>4</sup>Istituto Zooprofilattico Sperimentale del Lazio e della Toscana M. Aleandri Via Appia Nuova, 1411 – 00178 Rome, Italy

<sup>5</sup>Wageningen University and Research, Food Quality and Design, Bornse Weilanden 9, 6708WG Wageningen, The Netherlands

<sup>6</sup>LVA GmbH, Magdeburggasse 10, 3400 Klosterneuburg, Austria

<sup>7</sup>UCT Prague Technická 5, 166 28 Prague 6 – Dejvice, Czech Republic

### Introduction

The European Union (EU) has implemented various policies and initiatives aiming to ensure food safety, sustainability, and security, to reach the Sustainable Development Goals adopted by the United Nations General Assembly (such as ending hunger, promoting sustainable agriculture, ensuring food security, and addressing climate change).

The Farm to Fork Strategy, as part of the European Green Deal policy, aims to create a robust, fair, healthy, resilient, and environmentally sustainable food system. It is complemented by the FOOD 2030 strategy that introduces the systemic approach and encourages Research & Innovation for future-proofing food systems by collectively implementing the pathways for actions addressing four co-benefits: nutrition, climate, circularity, and innovation. It is expected to shape an EU-wide research and innovation partnership accelerating the transition towards healthy diets that are safe and sustainably produced in resilient EU and global food systems. **The overall goal is to safely transform the food system towards increased sustainability.** To facilitate effective policy integration for food systems transformation, significant investment is needed in relevant knowledge systems and **improved science-policy interfaces.**

The European Commission established a High-Level Expert Group (HLEG) to assess the needs and options for strengthening science–policy interfaces for improved food systems governance (IPFSS EXPERT GROUP, 2021). The 6 principles of the Science-Policy-Society Interface (SPSI) defined for food system transformation are political legitimacy, participation of traditionally excluded and equity-seeking groups, transparency and democracy, work across scales and sectors, autonomy and rigour and clearly defined and measured impacts. **Among the HLEG suggestions or recommendations is to create a forum for dialogue** to establish mechanisms where food policymakers can engage in discussions and set policy goals and strategies. Based

on the aspirational goals set on scientific views, the political or policy targets should consider the complexity of social and economic systems, trade-offs among different stakeholder targets and views (Singh et al 2021). It's expected to look at the sustainable food systems as a whole, into environmental, economic, social dimensions and their interactions, along the whole food value chain, also encouraging **multi-stakeholder partnerships** (Barbero Vignola et al 2024).

In this perspective, the EU Food Safety Forum can be the format connecting different levels of the Food Safety System stakeholders by providing structured mechanisms facilitating dialogue and sharing policy goals, as an observatory on Food Safety in Europe and a solid basis for further dialogues involving governments and policy makers.

Since 2021, starting with preparatory pre-forum events, the **EU Food Safety Forum is serving as a Science-Policy-Society interface**, an open space for discussion and collaboration as a periodic appointment for institutions, Food Safety Authorities, European and national Agencies, universities and research centres, companies, enterprises, consumers and umbrella associations.

The EU Food Safety Forum is a result of a comprehensive process of engagement (Lattanzio et al., 2023), to create interest in the community while anticipating topics, sharing experiences and including (new) supporting partners in this process. Choosing and investigating common and/or emerging topics is a means to convey the stakeholders and supporting partners to participate, fostering their alignment for a common vision. Also, the designed formula (including hosting partner, short duration, interactions, pitches, stakeholders' voices, and multi-perspective contributions including Youngs) supports this process. The Forum aims to cultivate collaboration and innovation in Food Safety, ensuring the EU continues to lead in protecting public health and foster the ONE HEALTH approach.

The second edition of the EU Food Safety Forum, held on December 2-3, 2024, at the CNR headquarters in Rome, marked another significant milestone for the EU Food Safety Platform. With a focus on innovation, collaboration, and forward-thinking approaches, the Forum's format featured several key sessions:

- A Science-Policy-Society session setting the scene and providing a multi-perspective overview of the current state of the European Food Safety System.
- A session dedicated to the update of the Strategic Research and Innovation Agenda, by exploring how ongoing EU projects are enhancing food safety and discuss future support mechanisms for food safety within EU food systems. This was an excellent opportunity to learn about innovative solutions being developed across Europe and how they can be integrated into broader food safety strategies.
- A session envisaging Networking Opportunities by hosting lead scientists from infrastructures, companies and networks, to foster connections, collaborations and knowledge sharing within the food safety community.
- Finally, the Forum hosted the Young Researchers and Innovators Session: a dedicated space intended to empower the next generation of scientist passionate

about food safety, to present their innovative ideas and solutions and initiate a dialogue with high level experts.

Main outcomes of each session are presented herein together with the envisaged **leading challenges for the EU Food Safety Systems of the future.**

## Setting the Scene

*Session contributors: Michele Picaro, Member of the European Parliament and ENVI, Antonio Decaro, President of ENVI and Member of the European Parliament, Giovanni Leonardi from the Italian Ministry of Health, Stef Bronzwaer from EFSA, and Lamia Somai from INSSPA, the Tunisian Food Safety Authority.*

The potential for One Health to become a foundational principle in EU policymaking is increasingly recognized as essential for achieving sustainable health outcomes. The integration of One Health into EU policies (EU, 2022), encompassing Food Safety policies, is progressing through coordinated efforts across multiple sectors, aligning with major environmental and health initiatives, and responding to emerging health challenges. The aim of the opening session was therefore to reflect on how to ensure that food safety initiatives align with public health priorities and evolving consumer expectations.

In the last century, several systemic challenges have undermined global health, societal well-being, and economies. These challenges include zoonotic and (re)-emerging infectious diseases, emerging pollutants (e.g. microplastics), pandemic diseases (e.g. COVID-19), the necessary transition to sustainable food systems, the rise of antimicrobial resistance, climate change, and unstable political scenarios. The One Health (OH) approach is essential to overcome these interconnected challenges and strengthen our societies, as it recognizes the interdependence of humans, animals, plants, and all other living organisms, the environment, and the shared risks they face (Bronzwaer et al., 2022; Adisasmito et al, 2022).

One Health approach advocates strong cooperation and transdisciplinary collaboration among food system actors, as well as EU agencies, each in its domain of expertise. The recently established framework for action of the cross-agency One Health Task Force builds on existing collaborations and aims to provide an added value and effectiveness to the joint initiatives. This framework focuses on five strategic objectives: i) Strategic coordination; ii) Research coordination and One Health driven agenda setting; iii) Capacity building; iv) One Health communication and stakeholder engagement; v) Partnership building among joint activities (Bronzwaer et al., 2024).

Nonetheless, several boundaries hinder One Health to be implemented. One of the primary challenges is the lack of a regulatory framework, followed by the lack of collaboration among the various actors involved, which hinders a coordinated approach to address health issues across human, animal, and environmental sectors; the latter

being often underrepresented or inadequately considered. Another obstacle is the insufficient availability of practical tools, such as data, methods, harmonized terminology, and education on One Health that could facilitate its principles effective application and sharing. Resources for implementing One Health practices are often limited, further hindering its adoption.

Italy, the Forum hosting country in 2024, is concretely supporting the One Health approach as a vital strategy in public health. As part of its reorganization, the Italian Ministry of Health established a dedicated One Health Department for human, animal, and ecosystem health. The department is structured to strengthen activities that require cross-disciplinary skills, with a focus on sustainability crucial for ensuring that Italy meets its commitments under international frameworks related to health security and environmental protection. By collaborating with international organizations and participating in global health initiatives, the One Health Department contributes to policy-making that supports sustainable health practices. This includes addressing pressing issues such as climate change and antimicrobial resistance.

### The EU Funded Research Contribution

The session provided a valuable opportunity to reflect on how collaborative efforts and cutting-edge research have already begun transforming food systems, equipping them to meet future challenges, by exploring relevant topics and research directions from EU projects and addressing the question: ***How are EU projects driving innovation and boosting food safety in European food systems?***

The framework of this research is given by the Food2030 agenda (EU, 2020) and its Pathway for action “Food Safety Systems of the Future” which is central and linked to all other pathways.

The session focused on EU-funded projects that tackle significant systemic challenges facing future food systems, including:

- **Impact of Climate Change on Food Safety:** ensuring that food remains safe under changing climate conditions
- **Holistic Approaches for Safe, Nutritious, and Sustainable Food:** sustainable practices (including tools, policies, and business models) in food production, distribution, and consumption to preserve natural resources, in line with circularity and bioeconomy principles
- **Safety and security of African Food Systems,** also by eliminating fragmentation and improving collaboration through an EU-AU partnership platform.

All selected projects are implementing the **multi-actor approach** to develop innovative solutions to real needs, problems and challenges that the food safety systems stakeholders are facing at EU and global level.

Specific challenges and solutions under development are overviewed.

**MyMatch** - *Mycotoxin Management platform to face climate change impact on food safety and human health.*

MyMatch is positioned to play a pivotal role in shaping a more resilient EU Food Safety System by leveraging data analytics, stakeholder collaboration, and predictive modeling to address the **(re)-emerging mycotoxin risks associated with climate change**. MyMatch will develop **predictive models** to assess the risk of mycotoxin occurrence in various crops such as maize, wheat, tomato, and nuts, considering climate change scenarios. This proactive approach aims to mitigate risks associated with fungal contamination in the food supply chain. Through its **AI-powered MyMatch platform**, the project will provide tailored predictions and mitigation strategies for stakeholders, including farmers, food industry participants, and policymakers. This **Data-Driven Decision Support tool** will facilitate informed decision-making regarding food safety threats caused by climate-induced mycotoxin exposure.

*Project representative: Paola Battilani, Università Cattolica del Sacro Cuore, Italy (Coordinator)*

*Project website: <https://cordis.europa.eu/project/id/101181208>*

**CIPROMED** - *Circular and Inclusive utilisation of alternative PROteins in the MEDiterranean value chains*

CIPROMED's contributions to the EU Food Safety System revolve around enhancing local food production resilience. By targeting Mediterranean agri-food production the project aims at **promoting sustainable practices through waste valorization** and fostering collaboration among stakeholders to address emerging food safety challenges effectively. The CIPROMED project **promotes a circular economy by employing insects, legumes, and microalgae**, through innovative rearing and cultivation techniques to produce high-quality protein ingredients. This method ensures environmentally sustainable practices while maximizing protein yields thus reducing the dependency on imported protein sources.

The project also addresses nutritional needs by designing alternative protein-based diets, targeting metabolic and immune system health, potentially improving overall public health outcomes in the Mediterranean region.

*Project representative: Christos Rumbos, UTH - University of Thessaly, Greece*

*Project website: <https://cipromed-project.com/>*

**WATSON** - *A holistic frameWork with Anticounterfeit and inTelligence-based technologieS*

*that will assist food chain stakehOlders in rapidly identifying and preventing the spread of fraudulent practices*

Watson's contributions to the EU Food Safety System focus on **enhancing transparency**, empowering authorities with actionable data, promoting consumer

awareness, and leveraging innovative technologies to **combat food fraud** effectively. Watson will improve the traceability of food products by implementing advanced track-and-trace systems that provide accurate, real-time information throughout the food supply chain and generate **Data-Driven Insights for food safety Authorities**. By utilizing advanced analytics and intelligence-based tools, Watson aims to identify and prevent fraudulent practices in the food sector. The development of a **digital technology reference architecture** incorporates various innovative technologies, including AI-supported early warning systems, IoT-based tracing services, and Distributed Ledger Technology. These technologies work together to create a more transparent and tamper-proof information system within the food supply chain. This innovation will foster a more informed consumer base that prioritizes food safety in their purchasing decisions.

*Project representative: Hanna-Leena Alakomi, VTT, Finland*

*Project website: <https://watsonproject.eu/>*

#### **Up-rise - EU-AU Partnership for Resilient, Inclusive and Safe food systems for Everyone**

The Project Up-rise is addressing **mycotoxin contamination** by generating new knowledge and data **to deliver solutions in Africa**. The Consortium is committed to improve food safety in Africa by creating a **roadmap for a shared quality culture** that integrates the informal sector into formal food systems collaboration between formal and informal sectors, thus enhancing risk assessment and regulatory frameworks, and prioritizing education and training. Up-rise is also developing innovative solutions such as **monitoring and early warning systems** for mycotoxin contamination and **microbiome-based innovations** aimed at reducing mycotoxin levels in food productions. This holistic approach not only aims to mitigate mycotoxin risks but also **contributes to sustainable food safety practices in Africa, aligning with broader EU goals for resilient and inclusive food systems**.

*Project representative: Antonio Moretti, CNR-ISPRA, Italy*

*Project website: <https://uprisefoodsafety.org/>*

#### **HUMYCO - Investigating the Human Mycobolome through Uniting Large-scale Epidemiological and Mechanistic Polyomic Designs**

HUMYCO addresses the challenges of **assessing multiple mycotoxin exposures**. Through advanced metabolomic profiling, HUMYCO aims to unravel the toxicokinetic and dynamic profiles of mycotoxins, focusing on identifying and validating **new biomarkers of exposure** and effect. This foundational research is crucial for understanding how multiple mycotoxins co-occur in diets and their cumulative effects on human health, particularly in relation to gastrointestinal carcinomas. By experimentally determining genome-wide mutation spectra, HUMYCO aims to establish causative links between mycotoxin exposure and cancer risk, which is vital for informing public health policies. By utilizing large-scale epidemiological cohorts from both **Europe**



**and Africa**, HUMYCO investigates the associations between mycotoxin exposure and health outcomes. This cross-regional approach provides valuable insights into the global impact of mycotoxins on public health. HUMYCO's research findings will inform dietary recommendations and **food safety regulations** within the EU, contributing to strategies aimed at mitigating mycotoxin risks in food products.

*Project representative: Marthe De Boevre, Ghent University, Belgium (Coordinator)*

*Project website: <https://cordis.europa.eu/project/id/946192/results>*

### **FOODCoST** – *Redefining the value of food*

The FOODCoST project addresses the critical need for sustainable food systems through a comprehensive approach to **valuing and internalizing externalities along the food value chain**. Food safety measures are critical externalities within the food value chain, impacting both economic performance and public health outcomes. Addressing these issues through effective regulation and cooperation among stakeholders is essential for creating a sustainable and safe food system. FOODCoST proposes a **harmonized methodology** based on new analytical instruments to calculate externalities related to climate, biodiversity, environmental, social, and health impacts. Tested and validated in 11 diverse case studies, this framework aims to standardize how external costs are assessed across different food systems, enabling more consistent and reliable evaluations of food production and consumption impacts. By co-creating solutions and engaging stakeholders through a dedicated platform, the project will generate input to provide guidance to policymakers, businesses, and other actors in the food system.

*Project representative: Maurizia Castellari, APRE, Italy*

*Project website: <https://www.foodcost-project.eu/>*

### **OnFoods**- *Research and innovation for sustainable food and nutrition*

OnFoods aims at integrating sustainability into food value chains through a comprehensive approach that emphasizes innovation, collaboration, and transparency. By adopting a systemic perspective, Onfoods aims to improve **sustainability metrics** such as quality, **safety**, and security across the entire food value chain. While recognizing the role of technology in achieving sustainability goals and exploring innovations such as genetic technology and cultured meat, the project is building a **Sustainability Assessment Frameworks** by employing quantitative and qualitative methodologies to assess sustainability across supply chains. This includes analyzing environmental, economic, and social sustainability levels while communicating these findings to stakeholders.

A significant focus is placed on enhancing **transparency** within food value chains: this is crucial for building trust among stakeholders and encouraging sustainable consumption patterns. By fostering direct interactions between producers and consumers, OnFoods aims to increase consumer awareness of product origins and processes.

*Project representative: Daniele del Rio, University of Parma, Italy (Coordinator)*

*Project website: <https://onfoods.it/>*

The presented EU projects showcased efforts of the Food (Safety) Systems stakeholders to **integrate the One Health perspective in R&I** to generate co-benefits for human, animal and environmental health.

Mycotoxin contamination, a re-emerging issue due to the impact of climate change, is not just a food safety issue but also a public health concern that affects livestock productivity and environmental sustainability. Mycotoxins can reduce animal health and productivity, leading to economic losses in agriculture and food security challenges. The ongoing EU funded research builds on interdisciplinary collaboration across agriculture, health, and environmental sectors to mitigate the risks associated with mycotoxins. This includes improving agricultural practices, enhancing food safety regulations, and increasing public awareness about the dangers of mycotoxin exposure.

Fraudulent activities can lead to serious health consequences for consumers but also to unsustainable practices in food production and distribution, which may harm ecosystems. The incorporation of technology and data analytics into the food supply and value chain for detecting and monitoring food frauds not only protects consumers but also supports sustainable practices in food production.

EU funded R&I is fostering waste valorisation and specifically the “waste-to-protein” innovative technologies that can significantly reduce environmental impact while improving human and animal dietary diversity and nutrition. The integration of these practices not only addresses health concerns but also stimulates economic opportunities by supporting new industries focused on sustainable protein production. On the other side, creating a shared language and understanding of externalities associated with sustainable food productions, through collaboration among various stakeholders-farmers, businesses, consumers, and government entities - is essential for developing integrated strategies that address health and environmental challenges holistically.

## **Networks and Infrastructures**

The EU Food Safety Forum provided space for cooperation in the future, defining the wide framework including infrastructures, networks and innovation players.

This session’s presentations provided an overview of resources and services while remarking on the role of technologies and industries in boosting food safety systems in Europe.

Speakers were asked to address the questions: ***What are the key challenges your organization faces in ensuring food safety throughout the supply chain, and how do you address these challenges?***



### **MIRRI-IT**

The Italian Microbial Resource Research Infrastructure (MIRRI-IT) is part of a pan-European network for the preservation, systematic investigation, provision, and valorisation of microbial resources and biodiversity. It aims to provide a coordinated **framework for microbial culture collections** and biorepositories of over 40 public biorepositories from 9 European countries.

MIRRI-IT plays a significant role in the European food safety system by providing and distributing food starter cultures with broad applications and impacts: healthy, sustainable, and innovative food, traceability and safety in the food supply chain, sustainability in agriculture, and climate mitigation solutions.

MIRRI provides a robust framework for the effective use and maintenance of microbial resources, enabling their **full exploitation potential** across various applications, further strengthening food safety, resilience, and innovation in Europe.

*Infrastructure representative: Giovanna Cristina Varese, University of Turin, Italy (Coordinator)*

*Website: <https://www.mirri-it.it/>*

### **METROFOOD-RI**

The European Research Infrastructure for Promoting Metrology in Food and Nutrition (METROFOOD-RI) provides advanced **metrology services** that ensure accurate measurements in food safety assessments. METROFOOD-RI fosters data sharing, collaboration and networking by implement an **open data platform** for the integration and analysis of Findable, Accessible, Interoperable, and Reusable (FAIR) data.

By maintaining high standards of food quality and safety across Europe and promoting digital infrastructures for open access data, METROFOOD-RI makes a significant contribution to the European Food Safety System, as it aims to strengthen scientific knowledge, promote cooperation and foster interaction among various stakeholders, as well as creating a common and shared foundation of data, information, and knowledge.

*Infrastructure representative: Claudia Zoani, Enea, Italy (Coordinator)*

*Website: <https://www.metrofood.it/>*

### **EUROFIR**

**EUROFIR (European Food Information Resource)** is a network comprising 23 national food composition databases, bringing together members from national database organizations, universities, research institutes, policymakers, nutrition associations, and commercial organizations. In the context of globalization and the growing complexity of supply chains, EUROFIR focuses on **harmonizing and standardizing methodologies** for sampling, analysis, and food composition data, ensuring the availability of reliable, high-quality, and FAIR (Findable, Accessible, Interoperable, and Reusable) data.

EUROFIR' efforts focus on **integrating diverse data sources**, fostering collaboration among stakeholders, and advancing food composition knowledge to address emerging risks and strengthen the resilience of the European food system. This structured approach supports robust risk assessments, enhances food safety evaluations, and improves transparency and trust, ultimately safeguarding consumer health across Europe.

*Network representative: Karl Presser, Premotec, Switzerland (President)*

*Website: <https://www.eurofir.org/>*

### **LVA GmbH**

**LVA GmbH** is a private institute specializing in analyses and expertise for the food, feed, environment, pharmaceuticals, and cosmetics sectors. It provides **advanced testing**, expert advice, **audits**, and certifications to ensure safety and integrity across supply chains. Using accredited methods, LVA conducts extensive testing for contaminants, allergens, GMOs, and residues, while its audits safeguard transparency and trust throughout the food system.

The LVA TechNet initiative promotes research collaborations among international experts and academic institutions, **builds expertise among stakeholders**, and **engages the public** on critical food safety topics through various education initiatives (seminars, courses, podcasts). By engaging in advanced testing and auditing while building knowledge among stakeholders, LVA aims to mitigate food safety risks heightened by climate change and enhance food system transparency and integrity, ensuring safer and more resilient food in Europe.

*Company representative: David Steiner, LVA GmbH, Austria*

*Website: <https://www.lva.at/>*

### **MEDFILES**

Medfiles is an international company providing regulatory and consultancy services across the food, feed, and cosmetics sectors. Serving as a **link between food companies and EU authorities**, including the European Commission (EC), the European Food Safety Authority (EFSA), and national Food Safety Authorities (FSAs), Medfiles ensures compliance with strict EU standards. By assessing the regulatory status of products and ingredients, Medfiles helps businesses navigate complex requirements while also preparing dossiers for novel food, food enzyme and food additives applications, conducting risk and safety assessments, and facilitating communication with authorities in regulatory language.

Medfiles addresses critical challenges in food safety and sustainability by supporting businesses in adapting to evolving regulatory frameworks and ensuring compliance with new EU requirements and meeting the highest standards in food safety and sustainability, contributing to safer and resilient food systems globally.

*Company representative: Mari Eskola, MEDFILES, Finland*

*Website: <https://medfilesgroup.com/>*

## **CATALYSE**

The CATALYSE project is a large initiative aimed at enhancing food safety across Europe by effectively transforming research and innovation into practical, impactful solutions. Running from January 2024 to December 2026, the project serves as a **collaborative platform** that unites key stakeholders across the food supply chain—including innovators, regulators, academics, and businesses—creating an ecosystem of shared expertise and cooperation. The main contribution to the European Food Safety System relies on the establishment of a **robust network for knowledge exchange and best practices**, which plays a pivotal role in strengthening the European Food Safety System. By fostering collaboration across disciplines and sectors, the project ensures the integration of cutting-edge scientific advancements into real-world applications, enhancing food safety at every stage of the supply chain.

Through its strategic initiatives, CATALYSE will create tools to enable new knowledge and innovative solutions generated by the scientific and entrepreneurial community to be disseminated, applied and fully exploited by the food system. CATALYSE will also develop a **Community of Practice** to connect knowledge and innovation ecosystems in food safety, linking all stakeholders.

*Project representative: Daniela Bassi, Università Cattolica del Sacro Cuore, Italy (Coordinator)*

*Project website: <https://thecatalyseproject.eu/>*

## **The Global Harmonization Initiative**

The **Global Harmonization Initiative (GHI)** is a non-profit organization dedicated to advancing global food safety by fostering **scientific consensus and harmonizing food regulations and legislation**. Established in 2004 as a joint effort between the Institute of Food Technologists (IFT) International Division and the European Federation of Food Science and Technology (EFFoST), GHI brings together scientists, policymakers, and industry stakeholders to address disparities in food safety standards across nations.

By promoting the use of innovative food safety technologies globally, GHI aims to lessen the potential for foodborne illnesses and pandemic outbreaks. Through **capacity-building initiatives**, such as organizing scientific working groups, member meetings, workshops, and symposia, GHI facilitates collaboration and provides **educational outreach to key stakeholders**. These efforts help close knowledge gaps and equip food safety professionals with the tools to address emerging risks effectively. By promoting collaboration, scientific awareness, and innovation, GHI contributes significantly to creating a more resilient, science-driven food safety framework worldwide.

Organization representative: Paola Pittia, GHI, Italy  
Website: <https://www.globalharmonization.net/>

### “Youths in action for the Future of Food Safety in the EU”

Six selected young researchers took a central place in the “**Youths in action for the Future of Food Safety in the EU**” session, showcasing their innovative ideas and the impact they wish to achieve.

*Narges Ghoreishi* (<https://www.linkedin.com/in/narges-ghoreishi/>)

IDEA: Systematic error (bias) affects all real-world studies. Systematic error together with random error entails the study error, however, unlike random error (i.e. p-values and confidence intervals), it is rarely quantified. There have been previous attempts to assess risk of bias qualitatively (e.g. in systematic reviews), however, how these biases affect our study results remain unknown. My idea is about quantifying the amount of bias in food safety studies and how they affect study results.

IMPACT: Once we know the effect of bias, including measurement error, selection bias or confounding, on study results, we can make better decisions about the integration of studies in evidence synthesis. In addition, we can better plan future studies when we know which aspects of the study affect the results most and hence should be enhanced.

*Aristeidis Tsagkaris* (<https://www.linkedin.com/in/aristeidis-s-tsagkaris-a14424108/>)

IDEA: The core of my approach is that food analysis should be performed at the point-of-need, for example, on-field or at food industry settings. Currently, analysis is performed predominantly in the lab requiring sample transportation, documentation and high-end instrumentation. All these steps increase costs whilst on certain occasions, i.e., pesticide residue analysis, the tested samples are commonly not contaminated. This imposes a question whether the current analytical scheme utilizes the available resources effectively.

IMPACT: By optimizing resource use and minimizing unnecessary testing of uncontaminated samples, my approach enhances the efficiency of food safety practices and promotes timely interventions to protect public health. My vision for decentralized food control is demonstrated in my published studies on pesticide residues and ongoing funding for supporting mitigation measures against acrylamide, <https://orcid.org/0000-0003-4450-2611>.

*Tiina Mandel* (<https://www.linkedin.com/in/tiina-mandel/>)

IDEA: After completing the EU-FORA fellowship, my role as a PhD student is to carry out research activities, including risk assessment and ranking, on plant-based meat alternatives. The market for these products has increased rapidly during the last decade and is likely to triple by 2030. The research project will focus on safety and quality of plant-based meat alternatives and high-risk plant products. The complex and

multidisciplinary study will assess the products' microbiological and chemical hazards, including molecular analyses of isolated pathogens.

**IMPACT:** Research on food safety of plant-based meat alternatives helps to address potential risks associated with new food ingredients and technologies used in these products (e.g. alternative proteins and ultra-processing). Research is the basis for proper risk assessments, which can support regulatory compliance and therefore ensure consumer protection.

*Chiara Balbo (<https://www.linkedin.com/in/chiara-balbo-science-food/>)*

**IDEA:** I am a former EU-FORA fellow and currently a research fellow working on the project “UPea – Upcycling pea waste side streams for developing future food ingredients”. Our study explores the valorization of substandard peas into protein powders. By focusing on safe utilization and upcycling, the research aims to reduce food waste, enhance food security, and promote sustainable practices in food production and consumption.

**IMPACT:** Our work aims at ensuring environmental and consumer health benefits by developing novel, safe food ingredients with high technological and nutritional properties. Furthermore, it highlights the importance of harmonized risk assessment approaches for the investigation of multiple hazards in a single commodity. Finally, our work will contribute to fill data gaps in this field by increasing the knowledge on the safety of food products derived from peas.

*Melisa Jaramillo Zapata (<https://www.linkedin.com/in/melisa-jaramillo-zapata-743601158/>)*

**IDEA:** The research project aims to improve the detection of foodborne pathogens through the integration of molecular-based methods to traditional methodologies, exploring at the same time the intraspecies dynamics of pathogenic bacteria during culture enrichment processes. Additionally, the exploration of open databases of food bacterial communities targeting food-borne pathogens is also in our interest, to address the presence and occurrence of the bacteria along the food chain

**IMPACT:** Indeed, the results of this project will provide the apprehension of best approaches to assess microbiological safety controls to mitigate the risk. This project aims to enhance microbiological safety practices by refining detection methods, making them both effective and practical for labs and industry.

*Joana Oliveira (<https://www.linkedin.com/in/joana-oliveira-53ab441b8/>)*

**IDEA:** Insect production, particularly using black soldier fly larvae (BSFL), is emerging as a sustainable agri-food system due to its ability to bioremediate pollutants and process organic matter. Reintroducing food waste via insects could reduce its impact on human, animal, and environmental health. However, EU regulations ban using food waste as insect substrate due to contamination risks from ruminant proteins. Our idea aims to

assess these risks, ensure safety through microbiological and chemical analyses, and develop a traceable transgenic BSFL line and risk mitigation strategy.

**IMPACT:** This project will improve food safety by carefully managing contaminants and ensuring the safety of insect-derived products, paving the way for environmentally friendly and safe food production practices. My future ambition is to contribute to the food safety of new, resilient and sustainable agri-food systems.

Three young researchers won the pitch competition to have the chance to promote their ideas in the **Young Minds of Food Safety** podcast series, supported by our member **LVA Ltd**. Listen to the podcast [here!](#)

### Forum Outcomes: leading challenges and future R&I directions

Outcomes of the multi-actor discussions at the 2<sup>nd</sup> EU Food Safety Forum can be summarized in the following **main leading challenges for the EU Food Safety Systems of the future**:

- **Integration of One Health Principles:** there is a need for a cohesive framework that effectively integrates One Health principles across human, animal, and environmental health sectors to address interconnected challenges comprehensively.
- **Informing Regulatory Pathways:** by generating data-driven insights to support a robust regulatory framework that integrates food safety with sustainability efforts fostering effective governance and collaboration among stakeholders.
- **Data Availability and Sharing:** there is still insufficient access to practical tools such as data, harmonized methods and terminology that can facilitate effective implementation of food safety practices across different regions and sectors.
- **Emerging Threats from Climate Change:** the impact of climate change on food safety presents significant challenges, necessitating adaptive strategies to ensure food remains safe under changing environmental conditions.
- **Combatting Food Fraud:** the rise in fraudulent practices in food products calls for innovative technologies and systems to enhance transparency and traceability throughout the food supply chain.
- **Public Health Alignment:** ensuring that food safety initiatives align with evolving public health priorities and consumer expectations is crucial for maintaining trust and effectiveness in the food system.
- **Sustainability and Circular Economy:** support the food systems transformation by incorporating circular economy principles in (novel) food productions, while investigating challenges and developing solutions for potential food safety risks.
- **Adaptation to Technological Advancements:** keeping pace with rapid technological advancements in food production, processing, and distribution





requires continuous updates to food safety measures and risk assessment to ensure the safety of innovations.

- **Capacity Building and Education:** every individual in the food system plays a vital role in preventing contamination and responding to incidents. Initiatives aimed at educating the public about safe food practices, as well as training programs to share best practices in food safety management with food chain operators are crucial.
- **Collaboration among Stakeholders:** to increase the food safety system's resilience there it is essential to strengthen food safety infrastructures and foster collaboration through strategic partnerships and collaborative platforms. This will ensure timely responses to food safety incidents, creating a network of support that benefits everyone.
- **Resilience Against Supply Chain Disruptions:** Recent crises (e.g., COVID-19, geopolitical conflicts) have highlighted vulnerabilities in food supply chains. Strengthening risk management, ensuring diversified sourcing, and developing rapid-response mechanisms are critical to maintaining food safety and availability.
- **Digitalization and AI for Food Safety:** the increasing role of AI, machine learning, and big data in food safety requires frameworks for ethical AI use, reliable predictive analytics, and secure data governance to enhance risk assessment, traceability, and compliance monitoring.

These challenges highlight the complexities faced by the EU Food Safety Systems and underscore the importance of collaborative efforts. The EU Food Safety Forum will continue to serve as a vital platform where we can come together to co-create solutions for safe, sustainable, inclusive and resilient food systems in the future.

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