

THESIS RESEARCH TOPICS

MSc FOOD QUALITY MANAGEMENT 2026-2027



Pictures by [Rajesh Syangtan](#), [Ramaz Bluashvili](#) and [Anete Lusina](#) on Pexels

MFQ thesis coordinator: Dr. ir. Elsbeth Spelt

These topics were made available in Spring 2026 for first-year students participating in the program Food Quality Management at Wageningen University who planned a thesis in the academic year 2026-2027. New topics will be issued in Spring 2027 for the academic year 2027-2028 and so on.

Research themes

I. Food safety and quality in food companies and supply chains	3
II. Food handlers' role and FS culture in food safety risks in catering and food manufacturing	8
III. Digitalisation in food safety and quality management	13
IV Coping with the dynamic external business environment in food quality management	20
V: Sustainable food systems and novel protein production	27
VI: Consumer perceptions and product interactions	32
VII: Food fraud – Elucidating food supply chain integrity	41

I. Food safety and quality in food companies and supply chains

Introduction

Ensuring food safety and quality is the daily business of food companies and supply chains worldwide. Multiple research projects are conducted to enhance the understanding of technological and managerial factors that influence the production of safe and high-quality food. Knowing these factors and their way(s) of influence is important for designing and implementing the necessary control and assurance systems. These systems should comply, on the one hand, with legislation, product specifications, public guidelines, and private standards, and, on the other hand, meet the consumers' expectations on food safety and food quality. Every year, we have new thesis topics combining these different stakeholders' interests, which require interdisciplinary research considering the technological and managerial disciplines. On the next pages, you can find these thesis topics contributing to a broad variety of interdisciplinary research projects in and outside Wageningen University.



Pictures by [Mark Stebnicki](#) and [Anna Shvets](#) on Pexels

1. Closing the digital gap in African agri-food exports to Europe: towards traceable food safety and quality systems using HACCP principles

Building on previous MFQ thesis research: Yes, recently two master thesis students

MFQ specialisations: Quality control and assurance

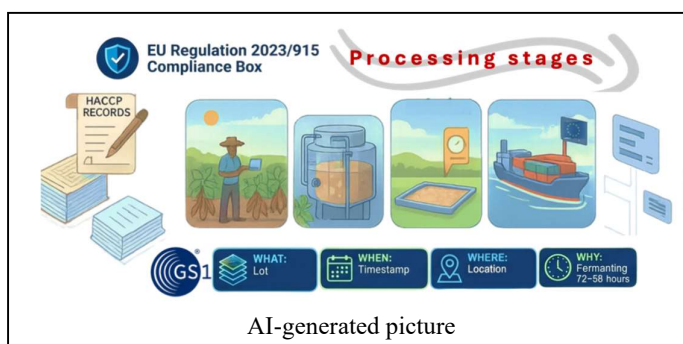
Supervisors: Ayalew Kassahun, Elsbeth Spelt and GS1 representative(s)

Open to 1-2 students

Problem description

Two EU Horizon-funded projects ([FS4Africa](#) and [STREAMING](#)) were launched to improve food safety in Africa and AU–EU trade in African agri-food products. Recently, two MFQ thesis students researched on two African export products: the cassava and tea value chains. They identified critical food safety and quality control points (CCPs) related to the risks of cyanide and lead contamination in cassava, and quality parameters such as the levels of thearubigins (TR) and theaflavins (TF) related to tea quality. Their studies indicated a significant digital gap between the available digital solutions and the largely manual and paper-based practices still used in African agri-food value chains.

There are many digital technologies and standards for supporting HACCP and sharing food safety and quality information, especially on the producing premises itself. Other technologies, particularly those from [GS1](#), facilitate trade as a whole by simplifying the exchange of information with trading partners and help reduce the risk of product rejection at European ports. GS1 is a non-governmental network of organisations in more than 120 countries with over 2 million member business users. GS1 is renowned for its EAN-barcode standards used worldwide.



Within this context, two new master thesis students will work on promoting the broader adoption of GS1 standards across African food value chains. The aim of each thesis research will be to investigate how a digital traceability framework can support the capture and sharing of CCP data based on a selected agri-food value chain (in consultation with the student, supervisors, and project partners) used as a case study. Part of research questions envisaged include:

- What are the CCPs for food safety or quality for the value chain of the selected product?
- How are CCPs currently monitored, documented and shared? Who are involved in these?
- Why are these CCPs currently monitored, documented and shared?
- What regulatory import requirements in Europe make digital HACCP traceability data desirable?
- How can these digital HACCP traceability data be captured and shared based on GS1 standards?
- How would a modular digital traceability framework look like for HACCP-based transparency?

Further reading:

- Kassahun, A., et al. (2023). A framework for modelling and designing transparency systems: A case of a Vietnamese pork supply chain. *Heliyon*, 9(11).
- Luning, P.A. and Marcelis, W.J. (2007). A conceptual model of food quality management functions based on a techno-managerial approach. *Trends in food science & technology*, 18(3).

2. From science to policy: Analysing the impacts of food processing, UPFs, and biotech foods in the EU

Supervisors: Vincenzo Fogliano (WU) and Luisella Ciani (EFF)

Building on previous MFQ thesis research: No

MFQ specialisations: Quality control and assurance, User-oriented food quality

Open to 1 students

Problem description

The European Food Forum (EFF) is a non-partisan, multi-stakeholders forum founded and governed by elected Members of the European Parliament. EFF will organise a series of structured Dialogue dealing with food processing, Ultra-Processed Foods (UPFs), plant-based foods, and biotech foods, with a specific focus on their health, innovation, and industrial impacts in the EU context.

The dialogue will explore how current and future regulatory choices influence public health outcomes, innovation capacity, industrial competitiveness, and consumer trust, taking into account scientific evidence and market realities.



Picture by [Jonas Horsch](#) on Pexels

The first objective of the thesis is to develop preparative documents to support a neutral, scientific, and evidence-based discussion within the framework of the European Food Forum. This elicitation material should analyse the health, economic, employment, environmental, and consumer impacts of different food technologies and compare policy approaches at EU and Member State level. The second objective of the thesis will be to produce a discussion Paper as the final output of the Structured Dialogue which can contribute to the development of balanced, policy-relevant recommendations for EU food policy. This discussion Paper will be developed collaboratively under the EFF with the contribution of participating members and supported by academic input and it will be disseminated by the European Food Forum to EU institutions and Member States, MEPs and APAs, and shared through the EFF website and EFF communication channels.

This is a unique opportunity for students to collaborate on their thesis with policymakers, EFF members, and other stakeholders. During the thesis the student will:

- Follow the meetings of the EFF Structured Dialogue
- Support research, data collection, and evidence review
- Contribute to background analysis and drafting activities
- Prepare the elicitation material and the discussion paper as part of a master's or graduate thesis, in line with academic requirements.

The thesis will be performed partially in Wageningen and partially in Brussels. A reimbursement of travel and meal expenses is possible.

3. Ranking the risks of food-borne zoonoses in the Netherlands

Supervisor: Henk Hogeveen

Building on previous MFQ thesis research: No

MFQ specialisations: Quality control and assurance

Open to 1 student

Problem description

Every so many years, the Dutch Institute for the Environment and Public Health (RIVM) makes a report on the consequences of zoonoses in the Netherlands (State of Zoonoses). Recently a renewed version is made and a total of 82 zoonoses have been scored on a number of items, such as the public health burden and the economic burden. We will use these results as the basis for an alternative method of ranking, using economic methods derived from the field of production economics (data envelopment analysis). In this highly innovative study you will collaborate with RIVM (Frits van Vlaanderen) on working on this novel method of risk ranking.



Picture by [Katarzyna Modrzejewska](#) on Pexels

4. Assuring the quality of a milk-based product for military use

Supervisor: Kasper Hettinga

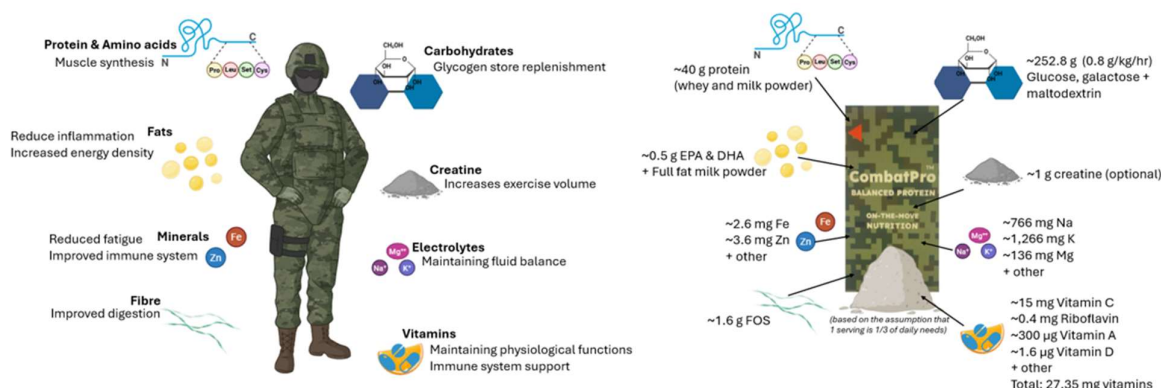
Building on previous MFQ thesis research: No (but there has been a case study done by a group of food technology students)

MFQ specialisations: Quality control and assurance

Open to 1 student

Problem description

For military personnel exposed to extreme and physically demanding conditions, limited recovery time, thermal stress and irregular food intake, a novel milk protein-based food supplement is being designed by the company “Visser & Sons”. This product will be based upon a range of ingredients (whey protein, casein, lipids, vitamins & minerals). This would position the product as a supplemental recovery nutrition for post-exercise use; however, it does not meet the requirements to make it an emergency food product. In a case study by food technology students, options for nutritional improvement have been suggested.



Picture by Tsiakiri et al., (2026)

However, these recommendations lead to both technological and managerial challenges. From a technological perspective, the product will be produced by dry blending (mixing of different powders), with the final product being dissolved in water just before consumption. However, some ingredients are not easily compatible (e.g. adding iron may enhance oxidation of omega-3 poly-unsaturated fatty acids). Next, a plant-based option is of interest, but this will lead to additional challenges. Also, shelf life is an important consideration, especially when different ingredients are mixed. Finally, the compatibility of the recipe with NATO and other regulations needs to be investigated. These questions need investigation, using literature, legal document analysis, interviews and potentially some lab work.

Reference

Tsiakiri, A., Logiadi C., Smissaert, R., Groen, V., Zilvold, Q., & Kooijmans F. (2026). Combat Pro™ – The optimization of Combat Pro™ as both a recovery and energy product (course report). Wageningen Universiteit.

II. Food handlers' role and FS culture in food safety risks in catering and food manufacturing

Introduction

For several decades, actors across the food supply chain, from primary production to catering and retail, have recognised the importance of maintaining robust food safety management systems to ensure safe food and meet legal requirements. In more recent years, there has been growing recognition of the vital role that people (such as farmers, food handlers, managers, and others) play in the effectiveness of these systems and in shaping an organisation's food safety culture. Today, the importance of food safety (FS) culture is acknowledged at multiple levels, including in the General Food Law, Codex Alimentarius guidelines, and the Global Food Safety Initiative (GFSI) Benchmarking Requirements. With FS culture now a part of the GFSI benchmarking criteria, all major private food safety standards (such as IFS, BRCGS, FSSC 22000, and SQF) have incorporated it into their schemes.

As a result, food enterprises are expected to actively engage with and cultivate a strong food safety culture. A strong and proactive FS culture is reflected in employees' consistent adherence to food safety and hygiene practices and a shared sense of responsibility for producing safe food across the entire organisation and supply chain. Among all employees, food handlers play a particularly critical role in the production, preparation, and serving of safe food.

Understanding the technological, managerial, and personal factors that influence their behaviour is thus essential to developing strategies to enhance food safety culture and ensure safe food throughout the supply chain.

Another perspective on food safety culture encompasses the role of auditors. As both public and private standards set requirements on assessing food safety culture and demonstrating improvement, auditors need to take food safety culture into account in their inspections and audits. As food safety culture is a behavioural phenomenon, it implies challenges for auditors, but there is not yet a consensus on how to address FS culture in audits (Da Cunha et al, 2025).

To support ongoing efforts in this field, we have outlined several research topics aimed at deepening the understanding of the role people play in preventing food safety issues from the food factory to catering.



Picture from Shutterstock under WUR license

Reference

Da Cunha, D.T., Stedefeldt, E., Luning, P.A., Prates, C.B., & Zanin, L.M. (2025). Food safety culture as a behavioural phenomenon shaping food safety. *Current Opinion in Food Science*, 63, <https://doi.org/10.1016/j.cofs.2025.101305>

5. Towards a science-based approach for practitioners to assess and foster food safety culture

Supervisors: Pieter Luning (FQD) and Laís Zanin (Univ. São Paulo)

Building on previous MFQ thesis research: Yes

MFQ specialisations: User-oriented food quality, Quality control and assurance, Quality management and entrepreneurship

Open to 1 student

Problem description

As FS culture gains recognition as a key driver of food safety performance, the need for robust, context-sensitive assessment methods and improvement interventions has become increasingly pressing. FS culture refers to the shared values, beliefs, and behaviours that influence food safety practices across an organisation and is shaped by, amongst others, leadership, commitment, communication, people, and the organisational and technological environment.

While research has outlined FS culture elements, developed various FS culture assessment tools and possible interventions, there is no consensus on which FS culture elements to prioritise, which tools to use, or how to interpret results effectively. As a result, practitioners face challenges in conducting FS



AI-generated picture

culture assessments that are meaningful and lead to actionable interventions. The overall goal of this project is to develop a science-based approach for practitioners to assess and foster food safety culture. This research seeks to address that gap through various directions. First, the research will examine challenges in designing, implementing, and interpreting FS culture assessments, including the use of tools such as surveys, interviews, and observations, and the barriers and enablers across different food sectors, particularly SMEs. Second, the research will investigate interventions that effectively foster FS culture. Through literature review and industry experiences, it will identify and evaluate strategies such as leadership training, peer coaching, and digital tools that could foster a proactive and mature food safety culture.

Reference

Zanin, L.M., Luning, P.A., & Stedefeldt, E. (2021). The evolution of food safety culture assessment: a mixed-methods systematic review. *Trends in Food Science & Technology*, 118, 125-142.

<https://doi.org/10.1016/j.tifs.2021.08.013>

6. Analysis of challenges and barriers in food safety communication in high-risk food operations

Supervisors: Pieternel Luning (FQD) and Laís Zanin (Univ. São Paulo)

Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality control and assurance, User-oriented food quality

Open to 1 student, preferably with a contact in the food industry, for the case study

Problem description

Nowadays, food safety (FS) culture is recognised as essential for protecting consumers and ensuring food safety. In the European Union, Regulation (EU) 2021/382 amended Regulation (EC) No. 853/2004, making the establishment and maintenance of an FSC mandatory. The requirements of Regulation (EU) 2021/382 can be grouped into five domains: (1) management and leadership, (2) training and awareness, (3) communication, (4) documentation, and (5) compliance and continuous improvement (Cavelius et al, 2023). Communication is particularly important, as the regulation requires transparent communication within and between departments, including the reporting of deviations and expectations. Open communication promotes the exchange of food safety information, strengthens shared understanding, and supports the early detection and correction of risks. Effective interdepartmental communication improves coordination and collaboration, while an open culture encourages employees to report concerns and suggest improvements without fear, supporting continuous improvement in food safety performance.

A previous MSc thesis examined how food safety messages are communicated, interpreted, and applied across organisational levels in a high-care fresh-cut production environment. Using a semi-structured literature review and an ethnographic case study, the research analysed documents, training materials, meetings, observations, and interviews. The findings showed that food safety information was shared through multiple channels, mainly addressing hygiene and contamination control, verification and monitoring, incidents and non-conformities, and foreign object control. Although written procedures and training provided structured information, communication effectiveness was hindered by fragmented information flows, unclear operational updates, language and cultural barriers, limited operator access to communication tools, and behavioural factors affecting willingness to speak up.



AI-generated picture

Further research aims at examining food safety communication in another case study to identify common patterns in FS-communication challenges and differences compared to previous case studies. Insights will be used to draft a conceptual framework reflecting critical factors affecting FS-communication.

Reference

Cavelius, L.S., Goebelbecker, J.M., and Morlock, G.E. Legal and normative requirements for food safety culture – a consolidated overview for food companies within the EU (2023). *Trends in Food Science & Technology*, 142, 104222. <https://doi.org/10.1016/j.tifs.2023.104222>

7. Developing micro learning modules to foster food handlers' risk awareness and food hygiene practices in catering

Supervisors: Pieternel Luning (FQD), Giorgiana Catunescu (FQD) and Laís Zanin as external expert (Univ. São Paulo)

Building on previous MFQ thesis research: Yes

MFQ specialisations: User-oriented food quality, Quality control and assurance

Open to 1 student

Problem description

In catering settings, food handlers are frequently involved in direct food preparation activities, making their hygiene practices and personal hygiene critical determinants of food safety (Levy et al., 2022). Although hygiene codes and protocols are important, compliance depends on food safety remaining a shared priority among all employees.

The catering workforce is often diverse and dynamic, resulting in variation in hygiene behaviour. Therefore, maintaining food safety standards requires continuous attention to the factors that drive compliance with hygiene requirements, as well as ongoing improvement of food safety knowledge and risk awareness. The Theory of Planned Behaviour (TPB) has been widely used to understand the drivers of hygiene behaviour with particular focus on optimistic bias (i.e. cognitive tendency to overestimate the likelihood of positive and underestimate the likelihood of negative events happening to us compared to others (e.g., Rodrigues et al., 2020).

However, effective interventions to improve food safety knowledge and risk perception among food handlers remain needed. Risk perception refers to the subjective evaluation of the likelihood and severity of harm caused by food-related hazards. Microlearning modules have been proposed as a promising intervention approach because they provide concise, targeted, and accessible training, particularly for seasonal workers, employees with language barriers, and staff with lower educational levels (Taylor & Hung, 2022).

Previous studies developed assessment questionnaires to measure food handlers' hygiene knowledge and behavioural drivers based on TPB, and tested microlearning modules aimed at improving hygiene knowledge and intentions to apply safe practices. However, risk perception appears to be relatively stable and difficult to influence through conventional interventions (Prates et al., submitted). This thesis, therefore, focuses on the development of microlearning modules to enhance food handlers' risk perception in catering settings.

References

- Levy, N., Hashiguchi, T. C. O., & Cecchini, M. (2022). Food safety policies and their effectiveness to prevent foodborne diseases in catering establishments: A systematic review and meta-analysis. *Food Research International*, 156, 111076. <https://doi.org/10.1016/j.foodres.2022.111076>.
- Taylor, A., & Hung, W. (2022). The Effects of Microlearning: A Scoping Review. *Educational Technology Research and Development*. <https://doi.org/10.1007/S11423-022-10084-1>
- Prates, B. C., Stedefeldt, E. Luning, P., & Zanin, M.L. Prates, Bottini (resubmitted in *Food Control*). Educational strategies grounded in the Theory of Planned Behaviour for sustainable food safety culture evolution.
- Rodrigues, K. L., Evesb, A., Neves, C. P. D., Soutoc, B. K., & Anjos, S. J. G. D. (2020). The role of Optimistic Bias in safe food handling behaviours in the food service sector. *Food Research International*, 130, 108732. <https://doi.org/10.1016/j.foodres.2019.108732>.

Good hygiene. Safe food. Healthy people



AI-generated picture

8. Challenges in auditing a company's prevailing FS culture- and auditor/inspector perspective

Supervisors: Pieter Luning (FQD) and Laís Zanin (Univ. São Paulo)

Building on previous MFQ thesis research: No

MFQ specialisations: User-oriented food quality, Quality control and assurance, Quality management and entrepreneurship

Open to 1 student

Problem situation

In the last decade, food safety culture emerged as an important determinant of the effectiveness of food safety management systems. Various incidents in the past showed that even audited FSMS can have outbreaks, which triggered researchers to define, conceptualise and operationalise food safety culture into elements such as food safety policy and strategy, engaging leadership, food safety communication, risk perception, consistency and adaptability of FSMS. In 202, the Codex Alimentarius adopted the concept of food safety culture in the general principles of food hygiene. As a consequence, in 2021, the European General Food Law amended Regulation (EU) 2021/382 Annex EC N0852/2004 on food hygiene and introduced three core pillars, including mandatory food safety culture.

Nowadays, food business operators are required to establish, maintain, and provide evidence of an appropriate food safety culture. The GFL addresses five core elements, including commitment and leadership towards food safety, employee engagement in food safety practices, awareness of food safety hazards and risks, open communication on food safety and adequate resources to be provided to ensure food is handled safely. Moreover, the Global Food Safety Initiative include food safety culture as an additional benchmark criterion, and all food safety standards nowadays include FS culture in their requirements (e.g. in BRCGS, IFS, FSSC22000).

Public (legal) and private standards are enforced through public inspection and third-party audits, respectively. As a consequence, inspectors and auditors need to consider FBO's activities regarding food safety culture as well. However, there is no clear protocol for auditors as food safety culture is a behavioural phenomenon which cannot be just checked by a checklist.

This thesis aims to gain insight into current practices of how food safety culture is inspected/audited, what challenges they perceive and how they try to overcome them. The research will explore the literature, analyse the FS culture requirements in legal and private standard documents and interview inspectors/auditors regarding. The research findings can be conceptualised into a conceptual model.



Picture from Shutterstock under WUR license



Picture from Shutterstock under WUR license

III. Digitalisation in food safety and quality management

Introduction

The food industry is challenged to consistently produce safe, high-quality food for a growing population; deal with climate change, the complex food supply chain, food loss and waste, comply with stricter official regulations, and respond to consumer demands for enhanced sustainability, authenticity and traceability. Under all these circumstances, the scope of traditional aspects of food safety and quality management (FSQM) is expanding toward sustainability, transparency, traceability, online/real-time access and evaluation aspects. The traditional FSQM methods (i.e., statistical process control, total quality management, and continuous improvement) are still relevant and useful; however, they are open to being complemented by digital technologies and data analytics.



AI-generated picture

With the spreading of the Fourth Industrial Revolution (Industry 4.0) towards other concepts such as *Food Quality 4.0* (Djekić et al., 2023), *Food Safety 4.0* (Trollman et al., 2024) and *Food Traceability 4.0* (Hassoun et al., 2024) have emerged. These concepts can be characterised by the use of novel and/or improving digital technologies (e.g., Artificial Intelligence (AI), cloud computing, blockchain, Internet of Things (IoT), smart sensors, autonomous robotics, big data and 3D food printing, etc.) in FSQM, and enhanced interconnectivity. Besides that, the food industry and official authorities (FDA, WHO, EU Commission, etc.) have become more interested in digitalisation and started moving towards Food Quality 4.0, Food Safety 4.0 and Food Traceability 4.0 concepts. However, despite the increasing interest in and

potential benefits of Industry 4.0 technologies in food safety and quality management, there is a lack of awareness and information about how the implementation of these technologies can improve processes and what the technological and managerial challenges are in the digital transformation of traditional FSQM. This research theme aims to investigate the current state, along with the experienced and/or perceived challenges and barriers to the adoption and/or implementation of advanced technologies within the framework of Food Quality and Safety 4.0, considering both technological and managerial perspectives. The goal is to generate insights that support the improvement of quality and safety management in the food industry. To this end, the research will cover several core topics outlined in the following pages.

References

- Djekić, I., Velebit, B., Pavlić, B., Putnik, P., Šojić Merkulov, D., Bebek Markovinović, A., & Bursać Kovačević, D. (2023). 'Food Quality 4.0: Sustainable Food Manufacturing for the Twenty-First Century'. *Food Engineering Reviews*, 15(4), 577-608.
- Trollman, H., Bader, F., Luo, Y., Garcia-Garcia, G., Jagtap, S., Parra-López, Colwill, J., & Trollman, F. (2024). 'Food Industry 4.0 Emerging Trends and Technologies in Sustainable Food Production and Consumption', 'Chapter 4- Food Safety 4.0'. Elsevier.
- Hassoun, A., Alhaj Abdullah, N., Aït-Kaddour, A., Ghellam, M., Beşir, A., Zannou, O., ... & Regenstein, J. M. (2024). Food traceability 4.0 as part of the fourth industrial revolution: key enabling technologies. *Critical Reviews in Food Science and Nutrition*, 64(3), 873-889.

9. Artificial intelligence in food safety management: applications, benefits, and implementation challenges

Supervisors: Selcen Semercioz-Oduncuoglu (FQD) and Pieterlun Luning (FQD)

Building on previous MFQ thesis research: Yes

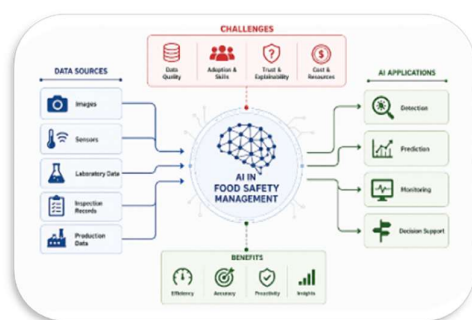
MFQ-specialisations: Quality assurance and control, Quality management and entrepreneurship

Open to 1 student

Problem description

The growing complexity of global food supply chains and increased demand for safer food have emphasised the need for proactive, predictive, data-driven safety management approaches. In parallel, AI in food safety management has become an increasingly important topic in both research and industry. The Food and Agriculture Organisation (FAO) hosted a global discussion on AI applications in areas such as bacterial phenotyping, food recall management, outbreak prediction, and antimicrobial resistance.

As food systems generate massive volumes of such data, AI is gaining importance in food safety by enabling the extraction of valuable insights from digital data sources that were previously underutilised (Yu et al., 2024). The previous thesis study (Andreou, 2025) investigated the potential of AI-driven, data-based predictive food safety applications, and findings showed that AI is predominantly proposed for biological hazard detection in the dairy sector, using various data types (e.g., images, inspector records, environmental measurements, microbiological, and chemical data).



AI-generated picture

Picture taken from: www.fao.org (2026)

Despite the growing interest in studies on AI applications in detection, classification, prediction, monitoring, and decision support, there is still a limited understanding of how these functions are being utilised across food safety management practices and what practical value they may provide. In addition, the potential implementation challenges associated with AI remain insufficiently explored, particularly from the stakeholders' perspective within the food sector.

Within this context, this research topic aims to explore the reported/utilised applications of AI in food safety management, their potential benefits, and the challenges affecting their implementation in practice.

References

- Yu, W., Ouyang, Z., Zhang, Y., Lu, Y., Wei, C., Tu, Y., & He, B. (2024). Research progress on the artificial intelligence applications in food safety and quality management. *Trends in Food Science & Technology*, 104855.
- Andreou, E. (2026). Applications of artificial intelligence in predictive food safety (MFQ thesis report). Wageningen University.

10. Barriers to AI adoption and/or implementation in food quality and safety control: perspectives from regulatory and certification actors

Supervisors: Selcen Semercioz - Oduncuoglu (FQD) and Pieternel Luning (FQD)

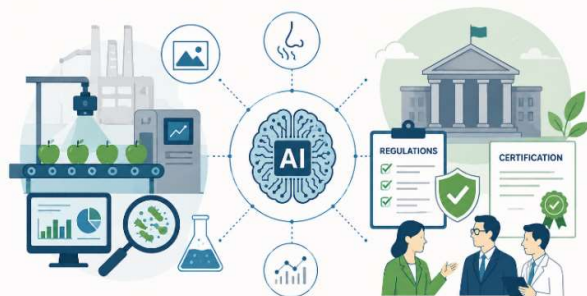
Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality control and assurance, Quality management and entrepreneurship

Open to 1 student

Problem description

According to the Food Quality 4.0 and Food Safety 4.0 concepts, AI is recognised as a key innovative technology that offers promising opportunities to enhance the control and assurance of food quality and safety (Hassoun et al., 2023; Trollman et al., 2024). AI plays a crucial role in handling large volumes of data generated by sensors, devices, and systems in food networks. By training on food quality and safety data, AI can identify patterns and predict potential quality and safety incidents (Trollman et al., 2024). Although most of the AI applications in food quality and safety control are at the laboratory-tested level, it is the most commonly reported I4.0 technology that is offered for many control practices. Some of the applications involve the training of AI models with food images from the various types of cameras to classify product quality (Przybyl et al., 2023), detect adulteration (Setiadi et al., 2022), and predict safety and quality (Wang et al., 2022). Another frequently used tool with AI is the electronic nose (E-nose), where AI models are trained with volatile compound data from the E-nose combined with chemical, microbiological, instrumental, and sensory test results to assess quality and predict microbial levels (Pulluri and Kumar et al., 2022).



AI-generated picture

Despite the interest in AI and AI-integrated technological designs, the barriers to their adoption and implementation have been less discussed compared to their potential benefits. Furthermore, barriers, especially from the regulatory and certification bodies' perspective, have been insufficiently addressed and discussed in the existing literature.

Within this frame, the proposed research aims to investigate perceived and practical

barriers in the adoption and/or implementation of AI technologies in the food quality and safety systems through a literature review and interviews with multi-actors, with particular attention to the perspectives of regulatory agencies and certification bodies.

References

- Przybyl, K., Gawrysiak-Witulska, M., Bielska, P., Rusinek, R., Gancarz, M., Dobrzański Jr, B., & Siger, A. (2023). Application of machine learning to assess the quality of food products—case study: Coffee bean. *Applied Sciences*, 13(19), 10786.
- Setiadi, I. C., Hatta, A. M., Koentjoro, S., Stendafity, S., Azizah, N. N., & Wijaya, W. Y. (2022). Adulteration detection in minced beef using low-cost color imaging system coupled with deep neural network. *Frontiers in Sustainable Food Systems*, 6, 1073969.
- Pulluri, K. K., & Kumar, V. N. (2022). Development of an integrated soft e-nose for food quality assessment. *IEEE Sensors Journal*, 22(15), 15111-15122.

11. Connected packaging for food safety: a study of data-embedded 2d barcodes in labelling, traceability, and regulatory compliance

Supervisors: Selcen Semercioz-Oduncuoglu (FQD) and Deniz Turan-Kunter (FQD)

Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality control and assurance, Quality and food logistics

Open to 1 student

Problem description

Food labelling and traceability are legally mandatory in the EU for all food and feed businesses. Labelling is crucial for providing specific information related to food safety (e.g., ingredients, intended use, batch number, shelf-life and storage conditions) and can influence consumer preferences and even national diets (Temple & Fraser, 2014).

A well-designed food traceability system is essential to identify the source of contamination and quickly recall affected products, prevent the spread of illness, manage allergens, and prevent the distribution of fraudulent products. Traceability systems can also provide detailed information about a product's origin, components, and processing history, which can enhance consumer safety. Although all these benefits of labelling and traceability, compliance with regulations still lacks sufficient motivation, especially among small and medium-sized entrepreneurs. Although money and time are common barriers, there are more complex root causes.



AI-generated picture

Embedding data in barcodes on food packaging can be considered one of the tools in the digitalisation of food quality and safety management, and may be a remedy to all these current problems related to labelling, traceability and compliance with food safety regulations. Particularly in light of the GS1 Sunrise 2027 transition from 1D EAN/UPC barcodes to 2D barcodes (e.g., QR codes, Data Matrix barcodes), data-embedded barcodes would help ensure compliance with the strict regulations that food manufacturers are subjected to by providing accurate, detailed and dynamic information (e.g., ingredients, production

methods, and distribution etc.) on food products compared to traditional labels and tracking and tracing the food products from the farm to their final destination more easily, more efficiently and more accurately (GS1 US, 2026).

This research topic will focus on the potential of connected packaging, specifically data-embedded 2D barcodes, to enhance food safety and quality management by improving labelling, traceability, and compliance with regulations in the food industry.

The research will examine how data-embedded 2D barcodes can help address gaps or weaknesses in existing food traceability systems and support compliance with relevant regulations in a selected country or region. In addition, the study will explore the implementation benefits, barriers, and stakeholder perspectives associated with the use of such technologies in food packaging. Based on the findings, the thesis may propose recommendations for optimising the use of data-embedded 2D barcodes to strengthen food safety management, traceability, and consumer protection. Data collection may be conducted through literature research, industry surveys, case studies, and/or expert interviews.

References

- Temple, N.J. & Fraser, J., (2014). Food labels: a critical assessment. *Nutrition*, 30(3), 257-260.
- GS1 US (2026). The World of 2D Barcode. Retrieved May 2026 from <https://www.gs1us.org/upcs-barcodes-prefixes/2d-barcodes>

12. Exploring quality prediction methods suitable for the (Indonesian) mango supply chain - a theoretical and practical perspective

Supervisors: Selcen Semercioz-Oduncuoglu (FQD), Iman Mas (PhD), Deniz Turan-Kunter (FQD)

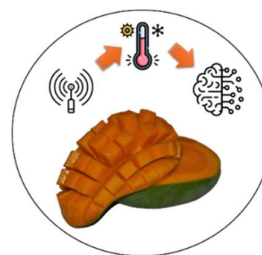
Building on previous MFQ thesis research: No

MFQ specialisations: Quality and food logistics, Quality control and assurance

Open to 1 student with an interest in modelling

Problem description

Mango (*Mangifera indica* L.) is a tropical, climacteric fruit regarded as one of the most extensively consumed fresh fruits globally (Evans et al., 2017). Indonesia is the fourth-largest producer of mangoes in the world (Evans et al., 2017; Kailaku et al., 2022). Nonetheless, the export of mangoes from Indonesia remains comparatively low, accounting for less than 1% of national production. Various studies have attributed this limited export capacity to issues such as deterioration and postharvest losses (PHL), primarily stemming from inconsistent cold-chain logistics, inadequate handling procedures, and subjective visual grading practices (Evans et al., 2017; Kiloos et al., 2024). These factors collectively hinder effective management of fruit ripening and accurate prediction of mango quality (Kailaku et al., 2022; Kailaku et al., 2023). A viable solution involves deploying smart sensors that provide real-time data to an AI model capable of making dynamic predictions about mango quality. Before implementing such a solution, it is essential to understand the current practices and knowledge related to predicting mango quality within the export Mango Supply Chain (MSC).



AI-generated picture

This research aims to explore the suitability of quality prediction methods for the (Indonesian) mango supply chain based on expert insights. Questions to address include:

- What are the primary causes of quality deterioration in mangoes within the industry?
- What methods are currently employed to predict mango quality in the MSC?
- What types of data inputs and outputs are associated with these prediction methods?
- What characteristics would an ideal mango quality prediction method possess for stakeholders along the MSC?

The research combines a literature review of mango quality prediction models with expert interviews to gather practical insights on data collection and use in the mango supply chain, including available data types, current practices, and existing constraints. The study is part of a PhD project focused on developing a machine learning model for mango quality prediction.

References

- Evans, E. A., Ballen, F. H., & Siddiq, M. (2017). Mango Production, Global Trade, Consumption Trends, and Postharvest Processing and Nutrition. In *Handbook of Mango Fruit* (pp. 1-16). <https://doi.org/https://doi.org/10.1002/9781119014362.ch1>
- Kailaku, S. I., Arkeman, Y., Purwanto, Y., & Udin, F. (2022). Logistics network configuration: The solution for quality-related problems in long-distance transportation of mango in Indonesia. *IOP Conference Series: Earth and Environmental Science*,
- Kailaku, S. I., Arkeman, Y., Purwanto, Y. A., & Udin, F. (2023). Appropriate harvest age of mango (*Mangifera indica* cv. Arumanis) for quality assurance in long distance transportation planning in Indonesia. *Journal of Agriculture and Food Research*, 14, 100763. <https://doi.org/https://doi.org/10.1016/j.jafr.2023.100763>
- Kiloos, A. M., Joyce, D. C., & Abdul Aziz, A. (2024). Exploring the challenges and opportunities of mango export from Indonesia: insights from stakeholder interviews. *The Qualitative Report*, 29(3), 811-830.

13. Human-centered AI in food systems: how digital tools shape decision-making, perception of quality, and adoption of sustainable practices

Supervisor: Maria Annosi (BMO)

Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality management and entrepreneurship

Open to 1 student

Problem description

This thesis examines how AI-based tools influence individual and organizational behaviour in food systems, with a focus on perception of food quality, trust, and adoption of sustainability practices. It will investigate how human-centered design of AI systems can improve engagement and reduce resistance to change.



Picture by [Tara Winstead](#) on Pexels

14. An usability/design study: How to implement genAI tools in food education?

Supervisors: Trang Anh Nguyen (FQD) and Teresa Oliviero (FQD)

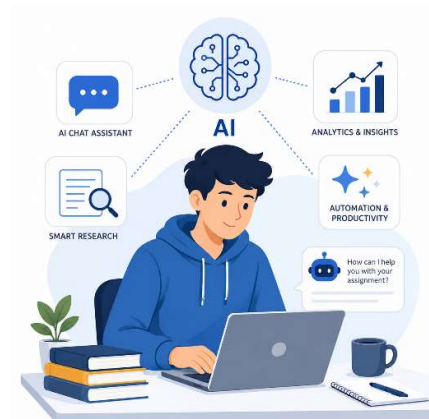
Building on previous MFQ thesis research: No

MFQ specialisations: Quality control and assurance, Quality and food logistics, User-oriented food quality, Quality management and entrepreneurship

Open to 2 students

Problem description

In the last years, commercial generative artificial intelligence (genAI) tools such as ChatGPT, Deepseek and LeChat have gained popularity. GenAI tools have the ability to generate text, responses, pictures, audio tracks, videos and more. Their use seem promising as they have the ability to support students with understanding the material by asking questions back or by providing feedback on their answers.



AI-generated picture

However despite them being promising, genAI tools are still not used a lot in education. Many teachers struggle to implement genAI tools, because they do not know how to use and include these tools in their teaching activities. Furthermore, it is yet unclear whether these genAI tools can really help students achieve their learning outcomes. The possible aim of this thesis research is therefore to:

- Investigate how commercial genAI tools can be used to design effective educational material and support teachers in their teaching activities
- Investigate what teachers need to implement AI tools in their education in terms of knowledge, policy and practical consideration

With the following potential thesis activities:

- Investigate promising applications of genAI tools in education
- Investigate if courses need to be improved and how this can be done using genAI tools
- Design and develop new educational material that include the use genAI tools
- Interview educators to determine what they need to effectively implement AI tools in their education (E.g. AI tool user guidelines, effective AI policy or practicalities to implement AI tools).
- If time allows, (develop), test and evaluate newly designed educational material in Food Technology courses via surveys and interviews

15. Analysing implications of external business factors for food safety management systems

Supervisors: Pieterlun Luning (FQD) and Giordiana Catunescu (FQD)

Building on previous MFQ thesis research: No

MFQ-specialisations: Quality assurance and control, Quality management and entrepreneurship

Open to 1 student

Problem description

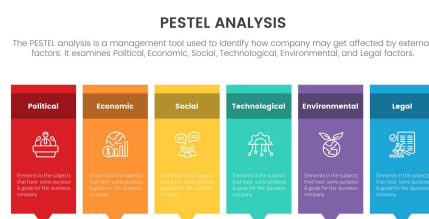
Food business operators (FBOs) are operating within an increasingly complex and interconnected global system, where multiple long-term societal and environmental trends are converging to reshape the conditions for safe and secure food production, distribution, and consumption. Key developments such as climate change, the global transition toward sustainability, population ageing in high-income countries, geopolitical tensions, and ongoing instability in global trade are collectively creating a more challenging environment for maintaining a reliable and safe food supply. Taken together, these pressures contribute to a range of systemic risks, including the depletion of natural resources, reduced vitality in plants and animals, and the expanding geographical distribution of animal and plant pathogens. They also increase the likelihood of contamination in food products through mycotoxins, agrichemical residues, and antimicrobial-resistant pathogens, while simultaneously threatening the stability of both food systems and the regulatory frameworks that govern them (Thorsen et al., 2025).

A widely used framework for analysing such external business drivers is PESTEL (Political, Economic, Social, Technological, Environmental, and Legal). This tool helps organisations systematically identify and monitor macro-level trends that are largely beyond their control. It has been applied across various sectors, including healthcare, textiles, and tourism, and has also been used in some studies to examine pressures within the agri-food chain (Madureira et al., 2024) and their implications for food safety management systems (Stoyanova, 2019). However, research in this area remains limited, particularly regarding how food business operators adapt to these external pressures in practice to sustain the effectiveness of their food safety management systems. As a result, there is still a lack of in-depth understanding of the strategies used to maintain food safety performance under increasingly volatile and uncertain global conditions.

This thesis aims to identify which pressures from the external business environment could affect the food safety management system and how. The study will include a literature search, development of a framework and interviews with quality assurance managers. The thesis will be demarcated to obtain more concrete insights.

References

- Thorsen M, Hill J, Farber J, Yiannas F, Rietjens IMCM, Venter P, Lues R, Bremer P. (2025). Megatrends and emerging issues: Impacts on food safety. *Comprehensive Reviews in Food Science and Food Safety*. e70170. doi:10.1111/1541-4337.70170.
- Madureira, T., Nunes, F., Mata, F., & Vaz-Velho, M. (2024). A SWOT analysis of organizations in the agri-food chain sector from the Northern region of Portugal using the PESTEL and MEETHS frameworks. *Agriculture*, 14(9), 1554.
- Stoyanova, A. (2019). Impact of external and internal circumstances on food safety management. *Trakia Journal of Sciences*, 17(1), 386-394.



Picture by [Muhammad Ribkhan](#) on Vecteezy

16. Sustainability integration: transforming food quality management systems for resilience in dynamic business landscapes

Supervisors: Giustina Pellegrini (BMO) and Giorgiana Catunescu (FQD)

Building on previous MFQ thesis research: No

MFQ-specialisations: Quality assurance and control, Quality management and entrepreneurship

Open to 1 student

Problem description

The food industry is facing growing pressure to become more sustainable because of environmental, social, and economic challenges. Companies are now expected to include sustainability measures in their quality management systems to respond to consumer concerns and stricter government regulations. This means businesses must rethink and improve the way they operate. Sustainability metrics are measurable indicators that help organisations evaluate their impact on the environment, society, and the economy (see site).

This thesis project aims to investigate how sustainability metrics can be integrated into food quality management systems. This could include updating existing quality management processes, introducing new methods for collecting and analysing data, and creating performance indicators to track sustainability while still maintaining food quality standards.

The project may also examine how integrating sustainability metrics can improve business resilience in the food industry. It will explore the main opportunities, challenges, and strategies that food companies need to adopt in order to align quality management with sustainability goals. This can help businesses adapt to changes in the food sector and contribute to a more sustainable industry overall.

The methodology involves a blend of literature review, case study, and empirical research. It examines existing studies and real-world examples and conducts surveys or interviews.



Own made picture based on ESG sustainability metrics

Further exploring:

Site explaining sustainability metrics: <https://www.presgo.com/articles/esg-metrics-definition-examples/>

17. Challenges and sustainability impact of circular practices in catering

Supervisors: Giorgiana Catunescu (FQD) and Pieternel Luning (FQD)

Building on previous MFQ thesis research: No

MFQ specialisations: User-oriented food quality, Quality control and assurance, Quality management and entrepreneurship

Open to 1 student

Problem description

The need for a transition towards a sustainable and circular economy has many implications for food production from farm to fork. Within this context, along the whole food supply chain, various initiatives are taken to reduce the burden of food waste, recycling packaging, valorisation of side streams, reuse of ingredients/foods, etc. In the catering sector, there is a need to move towards more sustainable and circular practices.

The Dutch Ministry's vision of circular catering has been defined to encompass: procurement (choosing products that apply circular principles), production (increasing recyclable bio-based raw materials for disposables, with as little mono-packaging as possible), business operations (minimally burdensome preparation methods and distribution processes), assortment choice (more vegetable proteins, preferably produced locally), and the use of residual flows (e.g. coffee grounds, tomato stems, beet pulp) (Greer et al, 2020). More globally, food waste reduction and the need for circular practices in the hospitality industry have been stressed (Bittner et al, 2021).



AI-generated picture

However, empirical work on the circular economy, particularly in catering, is still scarce (Kirchherr and van Santen, 2019). A previous MSc thesis analysed circular catering practices through a systematic literature review and categorised the practices according to the waste hierarchy. Furthermore, risks and benefits associated with these practices were identified.

A follow-up study could investigate through a case study, which circular catering practices are applied in daily routine; which factors influence the consistent application of these practices, and how they reduce food waste and lower environmental impact (e.g. less water, energy, packaging, etc.), i.e. the sustainability impact. The thesis topic will be further refined at the start of the thesis.



AI-generated picture

References

- Greer, E., von Wirth, T., & Loorbach, D. (2020). The diffusion of circular services: Transforming the Dutch catering sector. *Journal of Cleaner Production*, 267, 121906. <https://doi.org/10.1016/j.jclepro.2020.121906>.
- Kirchherr, J. W., and Ralf van Santen. "Research on the circular economy: A critique of the field." *Resources, conservation and recycling* 151 (2019).
- Bittner, N., Bakker, N., & Long, T. B. (2024). Circular economy and the hospitality industry: A comparison of the Netherlands and Indonesia. *Journal of Cleaner Production*, 141253.

18. Strategies for sustainable and circular food quality management

Supervisor: Maria Annosi (BMO)

Building on previous MFQ thesis research: No

MFQ-specialisations: Quality assurance and control, Quality management and entrepreneurship

Open to 1 student

Problem description

Environmental sustainability and circular economy ideas are becoming more important in the food industry, especially for maintaining food quality and safety. Problems such as climate change, environmental damage, and the overuse of natural resources are creating major challenges for the industry. Because of this, food companies need new ways to manage food quality that are both sustainable and circular.

There is a growing need for sustainable and circular business models that support food quality management. In this thesis, students are invited to explore useful strategies and methods for improving sustainable and circular food quality management, as well as ways to measure their impact.

Possible research topics include:

- Developing a theoretical framework for sustainable and circular food quality management through literature research and methods such as interviews or expert discussions.
- Investigating effective strategies and policies for sustainable and circular food quality management through literature research and one or more case studies (this requires collaboration with a company).

The exact thesis topic will be discussed and further refined at the start of the research, based on the student's interests.



Picture by [Mahyaddin Jabbarli](#) on Pexels

19. Exploring the integration of novel processing technologies to extend the shelf-life and reduce food waste in the food industry

Supervisors: Giustina Pellegrini (BMO) and Giorgiana Catunescu (FQD)

Building on previous MFQ thesis research: No

MFQ specialisations: Quality control and assurance, Quality management and entrepreneurship, User-oriented food quality

Open to 2 students

Problem description

In an agri-food company, novel processing technologies, such as mild and non-thermal technologies, are usually introduced to extend the shelf life of the product and reduce food waste, while maintaining or even enhancing product quality (e.g., higher nutritional value, improved taste) (Raza et al., 2026). These are compelling reasons for agri-food business operators (FBOs) to consider implementing novel processing technologies.

However, introducing new technologies into the production process does not always guarantee the intended outcome (Lohita and Srijaya, 2024). FBOs, especially agri-food SMEs, face two main challenges: (1) integrating the processing technology into existing processing activities and administrative procedures for operators (technology assimilation), and (2) aligning quality and shelf-life improvements with the preferences of the target consumer groups to maximise the opportunities presented by these technologies (business model innovation).

Successfully addressing these challenges enables FBOs to gain the benefits of processing technology integration. To optimize these processes and their interdependencies, research is needed into the factors influencing the successful introduction of novel processing technologies based on a techno-managerial approach.

Thus, the thesis aims to critically assess the factors encountered by FBOs, in general, and SMEs in particular, when integrating novel processing technologies from a technological, managerial, and consumer-centred perspective. The research will include an initial literature review, followed by expert interviews, and if needed, other relevant methods can be included. Based on the results of the thesis, several recommendations will be developed for FBOs, both for technology assimilation and the adoption of a new business model.



AI-generated picture

References

- Lohita, B. and Srijaya, M., 2024. “Novel Technologies for Shelf-Life Extension of Food Products as a Competitive Advantage: A Review”. in *Food Production, Diversity, and Safety Under Climate Change*, https://doi.org/10.1007/978-3-031-51647-4_24
- Raza, Ali., Hafiz Muhammad Abdullah, Muhammad Wasif, Muhammad Usman Butt, Muhammad Afzaal, Abhayveer Singh, Rajashree Panigrahi, Mohd Asif Shah, 2026. “A Comprehensive Review on Non-Thermal Technologies in Food Processing & Implementation in Different Food Industries: Limitations and Challenges.” *Food Science & Nutrition*14, no. 4: e71712. <https://doi.org/10.1002/fsn3.71712>.

20. Healthy food design & ingredients opportunity: Mapping the market need and the startup landscape

Supervisor: Vincenzo Fogliano (WUR)

Building on previous MFQ thesis research: No

MFQ specialisation: Quality management and entrepreneurship

Open to 2 students

Problem description

Startups in the healthy food sector face a dynamic landscape shaped by evolving nutritional needs and innovative product solutions. The market increasingly demands personalized, functional foods, tailored to specific health goals (e.g., gut health, immunity, plant-based protein) and sustainable, clean-label ingredients. The rise of diet related to plant-based, low calories, keto, GLP-1 trends drives the demand for eco-friendly, convenient, and nutrient-dense options. Startups must navigate regulatory frameworks while leveraging new processing or AI technology for formulation, manufacturing and transparency. The challenge is to turn nutritional science and functional ingredients into practical, market-ready ingredients and food products. Success hinges on balancing science-backed innovation with consumer trust and engagement.

During the thesis work, beside the academic environment the student will have the opportunity to interact with people working in startups Venture Capital (VC) and large corporate Open Innovation to collect data and experience. After successful completion of the thesis it is possible to have a follow up internship in a VC.

The final deliverable of the thesis work will be:

- to realize a systematic mapping of the current landscape of Startup in the healthy food ingredients
- to develop a practical framework to categorize them
- to develop a scoring tool to evaluate their strong and weak points



Picture by [RDNE Stock project](#) on Pexels

V: Sustainable food systems and novel protein production

Introduction

The global food system faces significant challenges due to increasing population pressures, environmental degradation, and ethical concerns surrounding traditional food production methods. As the demand for sustainable food sources grows, there is a critical need to explore alternative protein sources, as well as ensure regional accessibility to affordable, healthy diets. This requires a comprehensive understanding of the complex value chains and regional factors that influence food production and consumption. Addressing these interconnected issues is essential for developing sustainable food systems that can meet future global nutritional needs while minimizing environmental impact.



Picture from Shutterstock under WUR license

21. Conceptualisation of insect quality: A synthesis of literature and expert perspectives

Supervisor: Maryia Mishyna (FQD)

Building on previous MFQ thesis research: No

Possibility to combine with internship: No

MFQ specialisations: Quality control and assurance

Open to 1 student

Problem description

Edible insects are increasingly recognised as a sustainable and nutritionally valuable protein source with the potential to address global food security challenges. A clear definition of “insect quality” is crucial for market development; however, unlike established concepts such as meat quality, a comprehensive and unified understanding of what comprises insect quality remains fragmented. Quality attributes such as nutritional composition, techno-functional properties, microbiological safety, and sensory characteristics are often studied in isolation, without a framework that applicable for raw insects and insect food ingredients.

This thesis aims to conceptualise and define the term “insect quality” by integrating scientific literature with expert perspectives from industry and academia. The study (1) will identify and organise the key dimensions of insect quality (nutritional value, techno-functionality, safety, sensory properties), (2) define the term “insect quality”, and (3) evaluate its applicability to both raw insect materials and processed insect food ingredients.

The research will comprise a systematic literature review and interviews and/or questionnaire with experts from academia and industry. The work will be done in collaboration with working group Insects Food Ingredients and Foods of Academic Society of Insects as Food and Feed (ASIFF).

The thesis is expected to deliver a multi-dimensional conceptual framework for insect quality and develop a definition of “insect quality”. The framework will serve as a foundation for future standardisation efforts, quality management protocols, and other research in the growing field of insect-based foods.



AI-generated picture

22. Food safety risks associated with insects as feed for poultry

Supervisor: Henk Hogeveen

Building on previous MFQ thesis research: No

MFQ specialisations: Quality control and assurance, Quality management and entrepreneurship

Open to 1 student

Problem description

Insects are seen as a sustainable source of high quality proteins and can be used as poultry feed. However, production of insects is relatively expensive, also due to the high quality substrate that is needed to grow insects. Lower quality substrates are possible but are associated with risks of contamination. A PhD student developed a bio-economic simulation model to calculate the costs of insect production. He is working on one contamination risk, but there are many more. Your task is to choose a food safety risk associated with substrates to be used for insect growing, work out the risk for public health as well as design potential monitoring systems throughout the insect growing chain, including the cost-effectivity of such a system. The simulation model that is available can be used to make the economic estimations.



Picture by [Quang Nguyen Vinh](#) on Pexels

23. Sustainability evaluation of the transition towards sustainable dietary patterns

Supervisor: Henk Hogeveen (contact person)

Building on previous MFQ thesis research: No

MFQ specialisations: Quality control and assurance, Quality management and entrepreneurship

Open to 1 student

Problem description

In recent years, considerable emphasis has been placed on the need to change our dietary habits towards more sustainable ones. The key aspect of this shift is the increased consumption of alternative protein sources (i.e. legumes, seeds, algae and insects) instead of those of animal origin (i.e. meat, fish, eggs and dairy products), which are traditionally consumed in Western countries. Overall, the benefits of promoting these dietary habits are twofold; in terms of both human health and reduced environmental impact. This holds true because the traditional-animal protein sources, through the breeding and processing practices, are the main contributors of the agri-food system's environmental impact. All in all, eating healthier and more sustainable has many benefits, but also negative drawbacks, such as the high costs.

The research question would be to evaluate the positive and negative aspects of transition to alternative protein diets, and to assess these in a semi quantitative way. The project will include literature review and expert study, and probably will use MCDA (multi criteria decision analyses) as the method.

This thesis is part of PhD research project, and you will be partly supervised by the PhD student as well as other staff.



Pictures by [NEOSIAM 2024+](#) and [Justin Eng](#) on Pexels

24. Assessing the potential for upscaling production of emerging novel protein sources: a chain perspective

Supervisors: Catriona Lakemond (FQD) and Giustina Pellegrini (BMO)

Building on previous MFQ thesis research: No

MFQ specialisations: Quality assurance and control, Quality management and entrepreneurship, User-oriented food quality

Open to 1 student

Problem description

The increasingly growing population puts great pressure on sustainable food production. Environmental and ethical concerns of the intensive traditional livestock production to feed the world population have been pointing out the need to develop production for an alternative supply of animal protein. Therefore, a range of alternative protein sources are upcoming. They range from more traditional ones like pulses (e.g. beans) to novel ones like algae, Quorn, cultured meat, and insects. Insects are, for example, a potential alternative because they are nutritious, easily reared, require minimum space, and can help limit the environmental footprint. However, to have a significant impact on the environment, the production of insects needs to be on a large scale, and barriers such as consumer acceptance and requirements for the production and commercialization of these products need to be addressed. In previous MSc work, the developing insect chain was extensively studied. The main bottlenecks for the expansion of large-scale production of insects as human food were found to be a lack of close collaboration between partners, the relationship with customers/consumers, and the lack of appropriate technical knowledge in insect rearing and processing. In general, increasing the production and how to use novel proteins for food applications is part of building new protein value chains. The impact of these value chains depends entirely on the ability to develop successful food products/protein-rich ingredients and to organize the necessary production chain in such a way that good quality products and ingredients are available and finally can reach the consumer. The current research will therefore investigate the similarities and differences of potential successful strategies with respect to the developing chains of various novel proteins.



AI-generated picture

VI: Consumer perceptions and product interactions

25. From claims to experience: Linking label promises to consumer experience in snack bars

Supervisor: Arianne van Eck

Building on previous MFQ thesis research: No

MFQ specialisations: User-oriented food quality

Open to 1 student

Problem description

Background: In recent years, eating patterns have shifted from traditional meals toward more frequent, smaller eating moments (a trend often referred to as snackification). Consumers increasingly replace full meals with snacks due to busy lifestyles, convenience needs, and a growing focus on health and personalization. As a result, snack bars have evolved from niche products into everyday food items consumed across multiple occasions (e.g., breakfast, on-the-go, post-workout).

At the same time, the product landscape has expanded rapidly. Snack bars now vary widely in nutritional positioning (e.g., high protein, low sugar, high fiber), functional benefits (e.g., energy, satiety, wellness) and sensory profiles (e.g., chewy, crunchy, flavorful). Consequently, clear alignment between product characteristics, sensory experience, and on-pack communication becomes increasingly important. Although literature provides insights into sensory drivers of liking and the role of packaging claims in food choice, there is limited understanding of how on-pack claims align with actual sensory experience and consumer perception at product level, especially within the increasingly diverse snack bar category.

Key question: To what extent are snack bar on-pack claims aligned with sensory properties and consumer perception of quality, and how can identified gaps/opportunities be addressed in product development and marketing?

Overview of the activities:

- Literature review: What are key quality attributes for snack bars?
- Label analysis: Collect and analyse claims of commercially available snack bars
- Linking label data and sensory/consumer data (data available for 30-40 bars)
- Recommendations: What are your key recommendations for product development and marketing teams?



Pictures by [Esra Afşar](#), [Polina Tankilevitch](#), and [Yaroslav Shuraev](#) on Pexels

26. Crave it again: Understanding how flavor drives repeated consumption

Supervisor: Arianne van Eck

Building on previous MFQ thesis research: No

MFQ specialisations: User-oriented food quality

Open to 1 student

Problem description

In food choice, flavor is one of the most important drivers of product acceptance and satisfaction. While first-time purchases are often influenced by branding, packaging, and curiosity, repeated purchases are primarily determined by the actual eating experience (including flavor).

Flavor is a complex, multi-dimensional concept, including attributes such as intensity, lingering, balance, complexity and familiarity. Although literature provides insights into flavor perception and food liking, there is still limited understanding of how specific flavor characteristics influence repeated consumption and loyalty behavior, particularly in real product contexts. Flavor is known to strongly influence repeat purchases, but it's unclear which aspects make consumers come back. In addition, companies often lack clear guidance on how to translate sensory insights into flavor strategies that maximize repeat purchases.

Key question: Which flavor characteristics drive repeated consumption, and how can these insights be used to optimize product development and marketing?

Overview of the activities:

- Literature review: What are key (flavor) quality attributes for foods and beverages?
- Empirical study: Focus groups and/or consumer test
- Recommendations: What are your key recommendations for product development and marketing teams?



Pictures by [ENESFILM](#), [Brigita R](#), [Yusuf Kaya](#), and [Lidya Kohen](#) on Pexels

27. Consumers' perception of risk communication in novel foods applied to emerging food processing technologies

Supervisors: Giorgiana Catunescu (FQD) and Lotte Pater (FQD)

Building on previous MFQ thesis research: No

MFQ specialisations: User-oriented food quality, Quality control and assurance

Open to 1 student

Problem description

Novel and emerging food technologies are gaining increasing attention within the food industry because of their potential to improve sustainability, extend shelf-life, preserve nutritional quality, and reduce food waste (Lohita and Srijaya, 2024). But, before novel food products can enter the EU market, they must be evaluated by the European Food Safety Authority (EFSA) to assess whether they are safe for consumers under their proposed conditions of use. In many cases, despite a favorable evaluation by EFSA, consumers often perceive novel food technologies as unfamiliar, artificial, or potentially risky. This is particularly the case when scientific uncertainty and limited public knowledge are involved, as is the case with the scientific language of EFSA's opinions and the nature of the novel technologies.

Risk communication, therefore, plays a central role in shaping consumer perceptions, acceptance, and purchasing behavior of foods produced using novel technologies. Miscommunication or poorly designed communication strategies may contribute to skepticism, confusion, or rejection of innovative food products, even when scientific assessments indicate that they are safe. In the EU context, EFSA itself has emphasized the importance of transparent, evidence-based, and participatory communication strategies to improve public trust in food safety governance (EFSA, 2022). However, there remains limited knowledge regarding how consumers interpret and respond to risk communication surrounding novel foods and emerging processing technologies.

This thesis aims to investigate consumers' perception of risk communication related to novel foods produced using emerging food processing technologies. The research will explore how different forms of communication influence consumer trust, perceived risks and benefits, acceptance, and willingness to consume such products. Particular attention will be given to the communication of uncertainty and transparency, as described in EFSA's guidance and policy frameworks. The study may focus on one or more specific technologies or food categories as case examples.

References

- Lohita, B. and Srijaya, M., 2024. "Novel Technologies for Shelf-Life Extension of Food Products as a Competitive Advantage: A Review". in Food Production, Diversity, and Safety Under Climate Change, https://doi.org/10.1007/978-3-031-51647-4_24
- European Food Safety Authority (EFSA), Domagoj Vrbos, Anthony Smith, Joana Sousa Lourenco, Giorgia Zamariola, Konstantinos Paraskevopoulos, Barbara Gallani, Claudia Heppner, Theme (concept) paper - Evidence-based risk communication in the EU Food Safety, EFSA Supporting Publications 19, no. 5 (2022).System, (<https://efsa.onlinelibrary.wiley.com/doi/pdf/10.2903/sp.efsa.2022.e200508>)



AI-generated picture

28. Consumers' perception of upcycled food

Supervisors: Lotte Pater (FQD)

Building on previous MFQ thesis research: No

MFQ specialisation: User-oriented food quality

Open to 2 students who have preferably passed FQD33806, YSS31806, YSS37806, or YSS33306

Problem description

Upcycled food (i.e. products made from ingredients that would otherwise go to waste) has emerged as a sustainable solution to global food loss and waste. While its environmental and economic benefits are widely discussed, consumer acceptance remains a crucial factor in its success. Do consumers want any information about upcycled food? Which information? And what other product, person, and context factors determine the acceptance of those upcycled foods?

Aim

This topic aims to explore how consumers perceive upcycled food in terms of quality, safety, sustainability, value, etc. It will examine the role of awareness, labelling, and trust in shaping perceptions, as well as potential barriers such as scepticism or negative associations. The findings will provide insights into strategies for improving consumer acceptance and promoting upcycled food as part of a sustainable food system. Since the topic is very new, it requires an explorative research method.



Picture from Shutterstock under WUR license

29. Consumers' perception of 'Ultra Processed Foods'

Supervisors: Lotte Pater (FQD) and Esther Oldenhuis (FQD)

Building on previous MFQ thesis research: No

MFQ specialisation: User-oriented food quality

Open to 2 students who have preferably passed FQD33806, YSS31806, YSS37806, or YSS33306

Problem description

In many countries across Europe, ultra-processed foods now make up a large share of what people buy for their households, sometimes up to half of all groceries. At the same time, many consumers feel confused about what “processed” really means and often associate it with being unhealthy or unnatural. This confusion can lead to mistrust of food producers and hesitation to try new food products.

This is particularly important because many sustainable and healthy food innovations, such as plant-based alternatives, fortified foods, or products with longer shelf lives, require some level of processing. If consumers distrust processing in general, they may reject these innovations, even when they are beneficial.

This thesis will explore how consumers understand and interpret the concept of ultra-processed foods, where their beliefs and concerns come from, and how these perceptions influence what they buy. It will also examine how this mistrust affects their willingness to accept new, more sustainable or healthy food products.

Using qualitative research methods, the study will aim to uncover:

- How consumers perceive and think about “ultra-processed foods”
- What drives their (mis)trust in food producers and processed products
- How these perceptions shape their purchasing decisions
- What kinds of communication or information could help improve understanding and trust

The goal is to provide insights that can help food producers, policymakers, and communicators better connect with consumers, reduce misunderstandings, and support the adoption of healthier and more sustainable food choices.



Picture from Shutterstock under WUR license

30. Consumers' perception of food risk and food safety

Supervisors: Lotte Pater (FQD) and Giorgiana Catunescu (FQD)

Building on previous MFQ thesis research: No

MFQ specialisation: User-oriented food quality

Open to 2 students who have preferably passed FQD33806, YSS31806, YSS37806, or YSS33306

Problem description

New types of food products, such as plant-based alternatives or hybrid foods that combine animal and plant ingredients, are becoming more common as the food system shifts toward sustainability. These products often use new ingredients, new production methods, and more complex supply chains. While experts may consider these foods safe, consumers do not always see them the same way.

Many people are unsure about how these products are made, what ingredients they contain, and whether they are truly safe or healthy. This can lead to doubts or mistrust, even when the products meet regulatory safety requirements. On the other hand, some consumers may trust products without fully understanding the risks. This shows a gap between how food safety risks are assessed by experts and how they are perceived by consumers.

This project aims to better understand how consumers think about risks related to new sustainable food products, and how these perceptions influence their trust and willingness to try such foods. It also explores how consumer perspectives could be better considered in food safety and quality decisions.

Using qualitative research methods, the study will investigate:

- How consumers understand and evaluate risks in new food products
- What makes consumers trust or distrust these products
- How transparency, labelling, and communication affect their perceptions

The goal is to generate practical insights for food producers, regulators, and policymakers on how to better align food safety risk assessment and communication with consumer expectations, in order to improve trust and support the acceptance of sustainable food innovations.



Picture from Shutterstock under WUR license

31. Rethinking plant-based foods - Comparing meat analogues and novel non-imitative products

Supervisors: Pieter Groen, Vincenzo Fogliano, Ruud Verkerk

Building on previous MFQ thesis research: No

MFQ specialisation: User-oriented food quality

Open to 2 students who have preferably passed FQD33806, YSS31806, YSS37806, or YSS33306

Problem description

There is an urgent need to re-structure our meat-based dietary patterns towards healthier and more sustainable plant-based diets. Despite the development of many plant-based imitations of meat (meat analogues), consumer adoption of these products remains low. Some studies suggest that this is because meat analogues often fail to meet consumer demands in terms of sensory correspondence with meat (Elzerman et al., 2021). In contrast, other research argues we should step away from this meat-imitation driven product development and develop ‘authentic’ plant-based products and meals that better align with consumers’ everyday meal practices (Groen et al., 2025; Peeters et al., 2024).

Since there is increased recognition that consumers are more open for ‘authentic’ or ‘complete’ plant-based meals, several companies have started to develop new plant-based products that are both healthier and more sustainable, yet not necessarily focused on imitating the sensory properties of meat. However, consumer perceptions and preferences towards such novel Non-Imitative Products are as of yet unknown.

This project aims to explore the emerging duality between meat analogues and such novel Non-Imitative Products. The project will explore recent developments in this field (both in science and society), and will explore how consumers perceive these new plant-based food concepts.

References

- Elzerman, J. E., Keulemans, L., Sap, R., & Luning, P. A. (2021). Situational appropriateness of meat products, meat substitutes and meat alternatives as perceived by Dutch consumers. *Food Quality and Preference*, 88, 104108. <https://doi.org/10.1016/J.FOODQUAL.2020.104108>
- Groen, A. P. J. P., Fogliano, V., & Steenbekkers, L. P. A. B. (2025). We are a family! Exploring flexitarian households’ meat reduction practices. *Appetite*, 207, 107860. <https://doi.org/10.1016/J.APPET.2025.107860>
- Peeters, A.-L., Tromp, N., Bulah, B., van der Meer, M., van den Boom, L., & Hekkert, P. (2024). Framing for the Protein Transition: Eight Pathways to Foster Plant-Based Diets Through Design. *Environmental Innovation and Societal Transitions*, 52, 100848. <https://doi.org/10.1016/j.eist.2024.100848>

32. Topics on “Consumer Studies”

Supervisors: Pieter Groen (FQD) and Bea Steenbekkers (FQD)

Building on previous MFQ thesis research: No

MFQ specialisation: User-oriented food quality

Open to 2 students who have preferably passed the course FQD33806, YSS31806 and/or YSS33306

Problem description

For this topic, you can choose a consumer food quality-related topic of your own choice. General guidelines for the topics are:

- Consumer perceptions and behaviour related to (innovative) food are involved
- The starting point should be the consumer-food product interaction, which might influence food quality
- The topic can be studied within different consumer segments and/or different contexts of use.

The final topic will be decided upon in consultation with the supervisor(s).

All topics have in common that they aim to get a deep understanding of consumer perceptions and behaviour, taking place in a certain daily-life context. Therefore, in most cases, qualitative research will be applied during your thesis. Some experience in doing qualitative research is thus required.



Pictures by [Helena Lopes](#) and [Kevin Malik](#) on Pexels

VII: Food fraud – Elucidating food supply chain integrity

Introduction

Food fraud is an emerging global issue that disturbs the normal market environment and a major concern not only for consumers (as end-users), but also for various supply chain actors as well as regulatory authorities. Food fraud is an ancient problem, with fraudsters becoming more sophisticated in their deceit in modern times. Food fraud activities result in considerable global monetary losses and erodes consumer confidence and trust in food products.

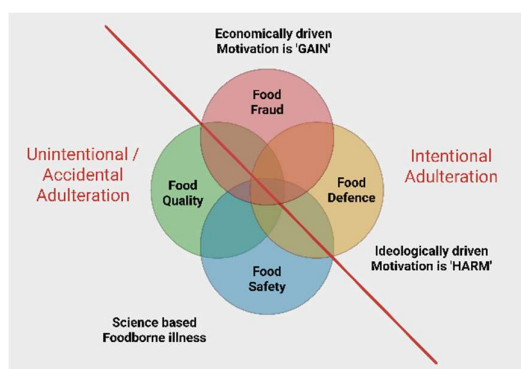


Image created with BioRender.com

Food fraud is defined by the Global Food Safety Initiative (GFSI) as “A collective term encompassing the deliberate and intentional substitution, addition, tampering or misrepresentation of food, food ingredients or food packaging, labeling, product information or false or misleading statements made about a product for economic gain that could impact consumer health.” (GFSI Benchmarking Requirements, 2017). The motivation behind food fraud is intentional and economically driven, where the crimes are defined as corporate or white-collar crimes. This implies that any plans and activities to

detect, mitigate, prevent, or even understand the risks associated with food fraud should consider an entire company’s activities, including some that may not be within the traditional food safety or even HACCP scope, applying methods closer to the criminal investigation. This means that when we study food fraud, we combine natural science with the social sciences to obtain a better understanding of food fraud.

Due to globalisation, food ingredients are sourced globally, while food supply chain networks have become more complex and adaptive in response to current worldwide incidents. There is also extra pressure to ensure that products from nature-positive agrifood production systems that enhance biodiversity and have lower environmental impacts do not fall victim to food fraud. The opportunities and motivations to commit fraud prevail, while the adequacy of controls is not always sufficient to deter fraud. Recently developed authentication techniques perform exceptionally well in detecting fraudulent, vulnerable food quality traits. However, rather than defending passively, an approach to actively prevent fraud crimes from happening in the early stage also needs to be investigated. This research topic on food fraud aims to investigate and provide research outcomes that can help to improve food supply chain integrity by elucidating risk factors (e.g., economic, societal, criminological, etc.) contributing to food fraud vulnerability and studying advances that can help in the fight against food fraud. The research will be conducted through the following topics described on the next pages.

33. Revisiting and updating the conceptual framework and indicators of food fraud vulnerability assessment

Supervisors: Sara Erasmus (FQD) and Pieterneel Luning (FQD)

Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality control and assurance, Quality and food logistics, User-oriented food quality, Quality management and entrepreneurship

Open to 1-2 students

Problem description

Food fraud vulnerability has been studied following different approaches that incorporate components of risk assessment (Spink & Moyer, 2011), the techno-managerial approach (Luning & Marcelis, 2006), criminology and behavioural science theories such as the Routine Activity Theory (RAT). Resultingly, key food fraud vulnerability elements (and categories) have emerged as opportunities (technical opportunities; opportunities in time and place), motivations (economic drivers; culture and behavioural drivers) and control measures (technical controls; managerial controls) (van Ruth et al., 2017). Each category composed of various factors or indicators. This was further developed into the Safe Supply of Affordable Food Everywhere (SSAFE) tool to be used by companies to conduct a food fraud vulnerability assessment as required by the Global Food Safety Initiative (GFSI) (SSAFE, 2026).

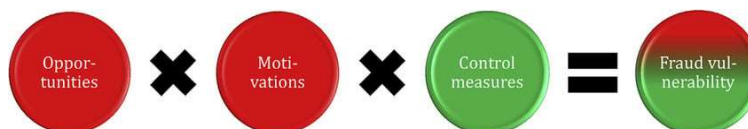


Image by van Ruth et al. (2017)

Other tools have also been developed such as the USP's Food Fraud Mitigation Guidance and the IFS Guideline Product Fraud Mitigation. There has also been recent advances in the conceptual understanding of food fraud vulnerability by integrating the concept of social vulnerability and highlighting its multi-level structure (Coral & Mithöfer, 2025). Hence, following almost 10 years of research since the first publication of the SSAFE tool (van Ruth et al., 2017), the time is right to review food fraud vulnerability.

This topic will explore the concept of food fraud vulnerability in depth. It will develop the conceptual framework of food fraud vulnerability assessment and assess if the current indicators should be updated or replaced, and/or if new indicators should be added. Another approach could also be to look into validating the indicators/factors linked to each category.

References

- Coral, C., & Mithöfer, D. (2025). Integrating social vulnerability into food fraud vulnerability assessment: policy implications for authenticity in Spanish honey. *Food Policy*, **136**, 102954. <https://doi.org/10.1016/j.foodpol.2025.102954>.
- Luning, P.A., & Marcelis, W.J. (2006). A techno-managerial approach in food quality management research. *Trends in Food Science & Technology*, **17**(7), 378-385. <https://doi.org/10.1016/j.tifs.2006.01.012>.
- SSAFE (2026). SSAFE Food Fraud Vulnerability Assessment Tool. <https://www.ssafe-food.org/resources/food-fraud-vulnerability-assessment-tool>
- Spink, J., & Moyer, D.C. (2011). Defining the public health threat of food fraud. *Journal of Food Science*, **76**(9), R157-R163. <https://doi.org/10.1111/j.1750-3841.2011.02417.x>.
- van Ruth, S.M., Huisman, W., & Luning, P.A. (2017). Food fraud vulnerability and its key factors. *Trends in Food Science & Technology*, **67**, 70-75. <https://doi.org/10.1016/j.tifs.2017.06.017>.

34. Utilizing social networks and crime script analysis to combat food crimes

Supervisors: Sara Erasmus (FQD), Wim Huisman (Amsterdam Vrije Universiteit) and Annemieke Pustjens (WFSR)

Building on previous MFQ thesis research: Yes

Possibility to combine with internship: No

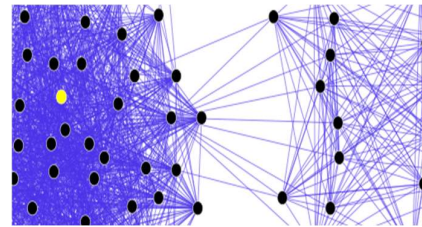
MFQ specialisations: Quality control and assurance, Quality and food logistics

Open to 1 student

Problem description

In the past years, the food fraud vulnerability assessment tool has been developed (van Ruth et al., 2017) and fraudulent company characteristics have been studied (van Ruth et al., 2021). Zhao et al. (2019) have conducted an empirical study on the supply chain adaptation to disruptions. Gomez et al. (2021) studied how supply chain diversity fights against food shocks. Nonetheless, food fraud-oriented supply chain network mechanisms have not been extensively studied and can be considered a knowledge gap. To this end, crime script analysis can outline the consequential steps and actions that are undertaken to prepare for, engaged in, and complete fraud crimes. Meanwhile, social network analysis as a developed tool can provide insights into social structures and supply chain actor interactions.

This topic will investigate the embedded mechanisms of fraud for a specific food product (to be decided) behind actors' social networks. The initial step is to build the food product's actors supply chain network. Afterwards, crime script analysis will be conducted to assess the opportunities and regulatory loopholes through previous food fraud cases. Social network analysis will then be implemented to identify the significant differences among their social networks and their critical nodes.



[This image](#) is licensed under [CC BY-SA](#)

Questionnaires oriented structural equation model and exponential random graph model will be utilized to provide insights into the relationships between social networks and food fraud crimes. The other approach for this topic would be to only focus on crime script analysis and conduct a study on online food fraud as presented by Holt and Lee (2022). This topic will build upon a previous FQD thesis that used crime script analysis.

References

- Gomez, M., Mejia, A., Ruddell, B.L., & Rushforth, R.R. (2021). Supply chain diversity buffers cities against food shocks. *Nature*, **595**(7866), 250-254.
- Holt, T.J., & Lee, J.R. (2022). A crime script analysis of counterfeit identity document procurement online. *Deviant Behavior*, **43**(3), 285–302. <https://doi.org/10.1080/01639625.2020.1825915>
- van Ruth, S.M., Huisman, W., & Luning, P.A. (2017). Food fraud vulnerability and its key factors. *Trends in Food Science & Technology*, **67**, 70-75. <https://doi.org/10.1016/j.tifs.2017.06.017>.
- van Ruth, S.M., & Nillesen, O. (2021). Which company characteristics make a food business at risk for food fraud? *Foods*, **10**(4), 842.
- Zhao, K., Zuo, Z., & Blackhurst, J.V. (2019). Modelling supply chain adaptation for disruptions: An empirically grounded complex adaptive systems approach. *Journal of Operations Management*, **65**(2), 190-212.

35. Food fraud mitigation strategies in food-insecure and marginalized communities

Supervisors: Sara Erasmus (FQD)

Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality control and assurance, User-oriented food quality, Quality management and entrepreneurship

Open to 1-2 students

Problem description

In low-income countries (LICs), food fraud is fuelled by factors such as inadequate surveillance systems, weak regulations, and policies. Investigating food fraud in LICs is crucial due to public health implication, lack of enforcement of food standards, the involvement of LICs in the chain, and the scarcity of food fraud research in LICs. Consequently, LICs contribute to the global burden of food fraud, where various foods are adulterated, counterfeited, or substituted for economic gains. Key food fraud drivers are weak/poorly enforced regulations and policies coupled with corruption; poor/lack of effective surveillance systems; economic/financial constraints; demand exceeding supply (Gwenzi et al, 2023).

This is also highly correlated with food insecurity because lack of food availability could increase food fraud risk. This food insecurity, fuelled by poverty, leads poor communities to purchase the lowest-priced food products to have more quantity gain. This creates an ideal opportunity for fraudsters to supply and sell fake and adulterated foods. Moreover, the bulk of the domestic food trade in LICs occurs via informal supply chains. This is characterized by low compliance with international standards, absence or non-enforcement of government regulations and limitations in technical expertise and infrastructure for food testing (Onyeaka et al, 2022). Although food fraud prevention frameworks exist (Spink et al., 2019), their implementation remains limited in marginalized settings.

Understanding how food-insecure communities perceive and respond to food fraud risks is critical to addressing these vulnerabilities. Factors such as social norms, cultural practices, and economic constraints shape their awareness, perception, understanding, and coping mechanisms. This topic builds on two previous thesis topics that investigated these awareness, perceptions and behaviours, filling a critical gap in knowledge and contributing to the development of targeted interventions to improve food safety and food security in these communities. You will expand on these new insights, improve the initial conceptual framework, and aim to develop strategies and interventions for mitigating food fraud in food-insecure and marginalized communities. You can also decide to focus on one of the ten ‘future research directions’ as described by Gwenzi et al. (2023).



[This image](#) is licensed under [CC BY-SA-NC](#)

References

- Gwenzi, W., Makuvara, Z., Marumure, J., Simbanegavi, T.T., Mukonza, S.S., & Chaukura, N. (2023). Chicanery in the food supply chain! Food fraud, mitigation, and research needs in low-income countries. *Trends in Food Science & Technology*, **136**, 194-223. <https://doi.org/10.1016/j.tifs.2023.03.027>
- Onyeaka, H., Ukwuru, M., Anumudu, C., & Anyogu, A. (2022). Food fraud in insecure times: challenges and opportunities for reducing food fraud in Africa. *Trends in Food Science & Technology*, **125**, 26-32. <https://doi.org/10.1016/j.tifs.2022.04.017>
- Spink, J., Chen, W., Zhang, G., & Speier-Pero, C. (2019). Introducing the food fraud prevention cycle (FFPC): A dynamic information management and strategic roadmap. *Food Control*, **105**, 233-241. <https://doi.org/10.1016/j.foodcont.2019.06.002>

36. The effect of agroecological practices on food authenticity of origin products

Supervisors: Sara Erasmus (FQD) and Omamuyovwi Dante Gbejewoh (Queens University, Kingston, Ontario, Canada)

Building on previous MFQ thesis research: Yes

MFQ specialisations: Quality control and assurance, Quality and food logistics, User-oriented food quality, Quality management and entrepreneurship

Open to 1 student

Problem description

There is increasing pressure on the global food supply chain to become more sustainable. However, achieving sustainability is not an easy task as sustainability is multifaceted, including dimensions of people (society), planet (environment), and profits (economics). With the pressure for food systems to become more sustainable, products and practices need to adapt accordingly, which could be detrimental to the authentic nature of a food product. Linking this specifically to the heritage food concept, that is defined according to the three dimensions of legacy ('anything that was transferred from the past to the present'), people ('group, society, and community'), and place ('country and geographical identity') (Almansouri et al., 2021), it is of interest to explore the effect of sustainability and alternative protein sources.

Heritage food also relates to food sovereignty as they are interconnected concepts. Food sovereignty is grounded in six pillars: 1. the right to food and nutrition; 2. public policies that value and support small-scale food providers; 3. localised food systems; 4. local control over natural food producing resources; 5. traditional knowledge; 6. agroecology. It empathizes the right of communities to determine their own healthy and culturally appropriate food systems that produce food through ecologically sound and sustainable methods (Forum for Food Sovereignty, 2007). Integral is the idea of the need to foster environmental sustainability and social justice in food production and consumption (Almansouri et al., 2021). Agroecological food systems also align with this concept as it creates and manages diverse agricultural landscapes, sustains biodiversity and maintains the cultural heritage. Furthermore, the sustainable and ecologically sound practices associated with heritage food production align with the principles of agroecology.

There is still a significant shortage of research examining how agroecological transitions might preserve, or even enhance, the food authenticity and heritage value of origin products. This topic builds on previous work and aims to explore agroecological practices and their potential relation to food authenticity, food heritage, and socio-economic sustainability within traditional food systems, with a specific focus on origin products. The expected output is insights into the impact of the agroecological farming on the perception of authenticity of origin products and how the specification of the product shapes the practices of the producers. This output will lead to understanding how agroecology impacts the authenticity of traditional products and if such an approach to agriculture can protect or reshape the perception of traditional products. This will be done by conducting a semi-structured literature review to build the conceptual framework, followed by semi-structured interviews to identify qualitative insights derived from supply chain actor perception(s).

References

- Almansouri, M., Verkerk, R., Fogliano, V., & Luning, P.A. (2021). Exploration of heritage food concept. *Trends in Food Science & Technology*, **111**, 790-797. <https://doi.org/10.1016/j.tifs.2021.01.013>
- Forum for Food Sovereignty. (2007). Declaration of Nyéléni. <http://nyeleni.org/IMG/pdf/DeclNyeleni-en.pdf> (Accessed 30 May 2025)

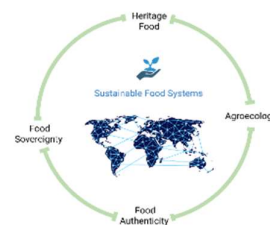


Image created with BioRender.com

