*** Student Award Competitor**

Purpose: With the arrival of large and growing amount of available data and advanced data analysis methodologies and tools, there is an increasing promise of achieving a deeper understanding of the food chain processes like never before. However, the breakthrough solutions are still missing. Where are we in this process? What to expect and what not? The main objective of the EFSA Advisory Forum Task Force on Data Collection and Modelling was to overview the European food safety data collection and reporting processes and the data model and IT infrastructure used, from a strategic perspective, and to formulate recommendations at a strategic level.

Methods: The experience from the European Food Safety Authority (EFSA) Advisory Forum Task Force on Data Collection and Modelling will be shared. The Task Force collected information and expert opinion from multiple EU Member States, through several interview and workshop sessions of the Task Force, during 14 meetings over the period of September 2018 to March 2020.

Results: The Task Force developed 21 strategic and 25 operational recommendations in 5 key areas for future management and analysis of data. The outcomes of the discussions were published in a report according to the data-related priorities identified: data collection and reporting, data modelling, IT architecture and data analysis.

Significance: It is conceivable that by 2027 the EU food safety system will be a network of highly digitalised, securely connected and interoperable food safety systems at national and EU levels, opening up access to real-time data in all parts of the network. However, this transition to become a data-driven organisation implies organisational, procedural and capacity-building changes for all stakeholders. This change, already in progress throughout the EU community, involves careful expectation management and change management as well.

T5-06 Food Safety Intervention Evaluations in Low- and Middle-Income Countries (LMICs)

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Introduction: Current frameworks for evaluating food safety problems in Low- and Middle-Income Countries often lead to adoption of programs that ultimately fail because they do not adequately address many of the unique institutional and cultural features of Low- and Middle-Income Countries (LMICs).

Purpose: This study examines features of LMICs and suggests a framework for evaluating proposed interventions to maximize the probability of adoption and sustained success in a specified country.

Methods: Evaluations of proposed food safety interventions typically involve, at best, a pilot project (with pathogen testing) combined with a risk assessment, and (possibly) a cost-effectiveness analysis to yield expected benefits from widespread adoption of the proposed program. This study subsumes the standard approach in a broader framework that considers institutional constraints, food system and household resilience, culture, incentives for adoption, and risk tradeoffs. The model is constructed based on an examination of literature from multiple disciplines; including risk analysis, economics, and consumer behavior.

Results: The resulting framework has the following broad attributes. First, there is an initial assessment of institutional capacity prior to intervention development. Intervention design and evaluation are then guided, in part, by a recursive process of examining cultural compatibility, incentive compatibility, risk tradeoffs, and newly obtained information about institutions. Finally, an implementation strategy is recommended based on similar factors.

Significance: The proposed framework is a first step towards formalizing what is generally understood by development specialists. Formal implementation will lead to better designed interventions, higher rates of sustainable adoption, and, ultimately, fewer foodborne illnesses in LMICs.

Technical Session 6 – Microbial Food Spoilage and Modeling and Risk Assessment

T6-01 Could *Listeria monocytogenes* be a Concern for an Innovative Chicken-Based Dry-Fermented Sausage?

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Introduction: *Listeria monocytogenes* may survive during the production process and subsequent storage of dry-fermented sausages, being a challenge for the food industry to comply with microbiological criteria of ≤100 CFU/g in EU or not detected/25g depending on the regulatory or market requirement.

Purpose: To assess the behaviour of *L. monocytogenes* in two types of chicken-based dry-fermented sausages of different calibre (ST: snack-type and FT: "fuet"-type) during (1) their manufacture with or without starter culture (*Lactobacillus sakei* CTC494) and (2) the subsequent high pressure processing (HPP) and/or corrective storage period.

Methods: Meat batter inoculated with *L. monocytogenes* and mixed with other ingredients was stuffed into small (ST) or medium (FT) casings. ST was fermented (22ºC/3d) and ripened (14ºC/7d) while FT was ripened (13ºC/16d). At the end of ripening, HPP (600MPa/5min) and/or corrective storage (4 or 15ºC/7d) were applied. *L. monocytogenes* was periodically enumerated on Chromogenic Agar. Different predictive models available in the literature were used to simulate the pathogen behaviour.

Results: During manufacturing, pathogen growth was observed only for ST without starter, achieving 3.24 $\log_{10}$ increase. Contrary, *L. monocytogenes* reductions up to 1.55 and 0.86 $\log_{10}$ in FT with and without starter, respectively, were observed. The starter promoted pH <5.11 and undissociated lactic acid production >5.5%. In general, predictive model outputs were in good agreement (i.e. ±1 $\log_{10}$) with the experimental results. HPP only caused a significant reduction of *L. monocytogenes* in ST, which showed higher a_w. Regardless of temperature, corrective storage did not promote the inactivation extent of the pathogen.

Significance: Production process conditions and starter culture application are key factors affecting the behaviour of *L. monocytogenes* in chicken dry-fermented sausages.

T6-02 Insights into the Use of Electrolysed Water and Metataxonomic Profiling to Extend the Shelf Life of Ground Beef

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Introduction: Nowadays the product losses caused by premature microbiological spoilage along meat distribution chain are still high and pose a serious sustainability issue. In this frame low initial contamination levels and the deep knowledge of meat microbiota composition are the *sine qua non* to extend its shelf life, especially in the case of ground beef.

Purpose: Therefore, effectiveness of pre-grinding treatment of beef with neutral-electrolysed water (EW) was here assessed on-site.

Methods: Hundreds of samples were collected from carcasses, cuts and ground beef in different production runs. Metataxonomic analysis targeting the 16S rRNA was coupled with plate counts and volatilomic/spoilage profiles during shelf-life under vacuum.

Results: Pre-grinding immersion of meat in EW (100 ppm of free-chlorine) produced a transient decontamination, as it did not modify the microbiota composition of ground beef and its further spoilage fate. Instead, microbiological succession patterns of spoilage species and volatilomic profiles differed significantly in relation to the production runs monitored and meat origin. Discrimination according to the origin has been further observed by profiling the microbiota of ground beef and carcasses processed in the same plant and production run, while microbiological and physical-chemical profiles did not significantly differ between batches. This fine discriminatory capability allowed to decipher which metataxonomic signatures may indicate a faster spoilage tendency from the early storage phases, namely: greater α-diversity parameters and *Streptococcaceae* abundances; high co-occurring presence of *Carnobacterium-Pseudomonas* on carcasses soon after slaughtering. Moreover, the development of *Lactococcus piscium* and acetoin formation have been identified as the main shelf-life endpoint indicators in ground beef.

Significance: In summary, decontamination with EW did not prolong the shelf life of ground beef. On the contrary, metataxonomic-based profiling of the meat from the early productive stages might represent an effective approach to sharply discriminate between batches with faster or slower spoilage tendency.