

CONFERENCE REPORT

Report from the first international MoniQA conference: increasing trust in rapid analysis for food quality and safety

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The first international MoniQA conference was held in Rome, Italy (8–10 October 2008) and brought together an audience of more than 200 food safety scientists, socio-economists, regulators, and industry and trade representatives as well as media correspondents. The participants had the opportunity to discuss the most recent challenges in avoiding and controlling unwanted substances in the food production chain as well as to listen to the newest developments and innovations in rapid and reliable analysis of food contaminants. Speakers included representatives from the Food and Agriculture Organization of the United Nations (FAO) and the European Commission as well as renowned experts on food safety issues from around the world. The conference was organized by Italian National Institute of Research in Food and Nutrition (INRAN) and International Association for Cereal Science and Technology (ICC) on behalf of MoniQA. ICC is also the coordinator of the MoniQA project. The conference was divided into sessions based on the MoniQA working groups, namely: Food Authenticity; Food Additives; Mycotoxins and Phycotoxins; Food Allergens; Chemical Contaminants; Microbiological Contaminants; and Horizontal Issues.

Session 1: Opening session

The conference was opened by Carlo Canella, the president of INRAN, and Marina Carcea (INRAN), who welcomed the participants. Roland Poms, the Secretary General of ICC and coordinator, presented an overview of MoniQA, outlining its key goals, working groups and stakeholders. Ezzedine Boutrif, the Director of the Food Quality and Consumer Protection Group (Food Quality and Standards Service) from the FAO, Food and Nutrition Division, explained the origins of the FAO and the current technical and policy challenges in the area of food safety and quality. André Pirlet, from the European Committee for Standardization (CEN), who also serves as chairman of the MoniQA

Advisory Panel, gave a presentation about CEN's aims, goals and values, and standardization in the food area as well as outlining co-operation with MoniQA. André Pirlet also talked about the role of the Advisory Panel, which enhances cross-fertilization through links with various research networks and other projects. Gerhard Schiefer from the International Center for Food Chain and Network Research (University Bonn) talked about risk management and trust in food safety and quality control, facts, perceptions and economic effects. His main socio-economic research interest focuses on private enterprises and the decisions they are faced with when dealing with public and private regulations as well as market expectations towards food safety and quality assurance. Finally, Roger Wood from the Food Standards Agency (UK) outlined international discussions within the Codex Alimentarius Committee on Methods of Analysis and Sampling on the determination of measurement uncertainty.

Session 2: Food authenticity

In the food authenticity session, chaired by Marina Carcea (INRAN, Italy), four authoritative speakers discussed the issue from different points-of-view. Paul Brereton, from the Central Science Laboratory of York (CSL, UK) and coordinator of Trace, presented recent problems with food authenticity such as verifying labelling descriptions and offered potential solutions including metabolite profiling methods and isotopic food maps. Simon Kelly, from the Institute of Food Research of Norwich (IFR, UK), stressed the interests of consumers in the geographical and production origins of foods, after recent food scares, and outlined research being conducted to verify origins, for example natural variation in the isotopic content of the bio-elements hydrogen, carbon, nitrogen, and the heavy element strontium. Christos Soukoulis, from the Laboratory of Food Chemistry and Technology of the University of Athens, underlined the

relationship between food authenticity and food safety. In particular, he stressed the latest advances of molecular biology and genetics, which have led to the development of simplified, rapid and automated methods, and analytical kits. Nelson Marmioli, from the Department of Environmental Sciences of the University of Parma in Italy, addressed the determination of origin and authenticity in olive oil using genomic and metabolomic methods (Oliv-Track and Cofin projects). The session highlighted the following needs in food authenticity: markers of food authenticity, validated methods, appropriate statistical elaboration of results, rapid and reliable methods, and databases of food authenticity markers to be updated in a timely fashion.

Session 3: Food additives

In the session on food additives and processing toxicants, chaired by Vasso Oreopoulou [National Technical University of Athens (NTUA), Greece], current status and the gaps in analytical methods were discussed and featured presentations from Dimitrios Chrysafidis (General Chemical State Laboratory Athens, Greece), Laurence Castle (CSL, UK), Vasso Psimouli (NTUA, Greece) and Umran Uygun (Hacettepe University, Turkey).

The primary issues included the need for screening methods to detect illegal use of unauthorized dyes and the lack of validated methods for determining preservatives and antioxidants in various foodstuffs. However, it was also acknowledged that there are particular difficulties in the area of food processing toxicants. Some substances have been known for some time, like polycyclic aromatic hydrocarbons, ethyl carbamate, trans-fats, N-nitrosoamines, and 3-monochloropropane diol, which have been studied extensively in terms of analysis, while others have emerged as being of concern more recently, such as acrylamide and furan. There is a need to test foods for existing and emerging food processing contaminants to allow estimates of exposure and risk to be made. Bound or masked forms of toxicants in food are of great interest. However, care must always be taken to ensure no artifactual formation of the target substance occurs during the analytical procedure. Emphasis should be given to the accuracy of the analytical method for processing contaminants while novel rapid methods are still to be developed.

Session 4: Mycotoxins and phycotoxins

The session, chaired by Hans van Egmond (RIVM, the Netherlands), focused on mycotoxins, which reflects the

activities of the MoniQA working group. The four contributions in the session, presented by Andreas Breidbach (IRMM, Belgium), Britt Maestroni (FAO, Austria), Anton Alldrick (Campden-BRI, UK), and Michele Solfrizzo (CNR, Italy), complemented one another, and gave a broad perspective on issues associated with sampling and analysis of mycotoxins. Mycotoxins have been the top-ranking concern in the European Union's (EU) Rapid Alert System for Food and Feed (RASFF) for several years, and it was clear that stringent EU legislation on mycotoxins continues to place rigorous demands on the performance of methods for sampling and analysis. An inquiry on the use of mycotoxin methods in practice – one of the first deliverables for the MoniQA working group 'Mycotoxins and Phycotoxins' – showed there are many issues still to be addressed. These range from accreditation, appropriate size-of-test portion, guidelines on the most convenient analytical method for each combination of mycotoxins/matrix, use of method validated through a collaborative study, participation in proficiency testing, use of reference/certified materials/calibrants, use of the same definition/calculation for LOD, LOQ, and repeatability through to measurement uncertainty. Dealing with all these issues in MoniQA will be a challenging, but also rewarding task that may help achieve the goal 'Increasing Trust in Rapid Analysis for Food Quality and Safety'.

Session 5: Food allergens

The food allergy session was chaired by Bert Pöpping from Eurofins, and started with a presentation by Margitta Worm (Allergie Centrum Charite Berlin, Germany) on the clinical aspects of food allergies and was followed by an update by Samuel Godefroy (Health Canada) on the efforts to develop a harmonized protocol for the validation of quantitative ELISA-based methods for the detection of food allergens. Clare Mills (IFR, UK) discussed consumer issues in food allergens and Adrian von Hengel (JRC/IRMM, Belgium) highlighted the issues from the perspective of authorities and legislature. Finally, Bert Pöpping summarized the activities of the allergen working group in MoniQA. Through these presentations, the allergen session summarized the *status quo* of the different sectors: industry, authorities, consumers, and laboratories. One aspect that was prominent was the concern around labelling of foods (descriptions like 'may contain . . .'). The MoniQA allergen working group has made significant progress putting together a peer-reviewed manuscript highlighting these issues, including findings of other related projects such as

EuroPrevall, an FP6 EU-funded Integrated Project examining the prevalence, and causes of food allergy globally. In addition, the MoniQA allergen working group has identified gaps and suggested ways forward to achieve harmonization in this area.

Session 6: Poster presentations and best poster award

Fifty-three abstracts, covering food authenticity, food additives, mycotoxins and phycotoxins, food allergens, chemical and microbiological contaminants, and cross-topic issues such as validation of qualitative methods, were awarded poster presentations in Rome. Of these, 11 were chosen by the chairs of MoniQA's working groups for further examination. André Pirelt (CEN) reviewed the science presented while Siân Astley (IFR) considered the communication aspects and chaired the session during which the authors gave an oral presentation describing their work. Often wrongly regarded as less important than oral presentations, posters not only allow PhD students to hone their writing and presenting skills but also provide more experienced researchers with opportunities for feedback and stimulate collaborative links.

Effective science communication using posters is not simple, as discussed in the Science Communication Workshop earlier in the week (Satellite Events). Nevertheless, some excellent examples of how it can be done were offered by top three posters. In first place, 'A potential antibody for *Shigella* enrichment in samples' by Zhimei Xie and colleagues, from the Huaxi School of Public Health, Sichuan University in Chengdu, China concluded that their purified recombinant IpaH protein was immunogenic, stimulating good immuno-reactivity and immunological specificity, and might be useful for enrichment of *Shigella* in food samples. 'Acrylamide in Polish food' was the topic of the second-place poster by Hanna Mojska and colleagues from the National Food and Nutrition Institute in Warsaw, Poland. They detected the highest levels of acrylamide in potato crisps and the lowest in oat flakes, but variety and processing were also important factors affecting acrylamide concentrations. This study is crucial in understanding acrylamide exposure from foods in the Polish population. Finally, in third place, a 'Survey and harmonization of worldwide mycotoxin regulations' by Marco Jonker and Hans Van Egmond from the National Institute for Public Health and the Environment (RIVM, the Netherlands) found harmonization of worldwide mycotoxin regulations has occurred in three economic communities, the EU, MERCOSUR, and Australia/New

Zealand. Of these, the EU has the most extensive legislation but the problems caused by mycotoxins are reflected in the RASFF, where 40% of the notifications are related to mycotoxins in food.

The authors will be invited to submit a full paper for publication in the next issue of the Journal.

Plenary lecture: food quality/safety control; FP7 research challenges

Antonio di Giulio, Head of the Unit Food, Health and Well-Being in Directorate E (Biotechnologies, Agriculture and Food) within the EC's Directorate General for Research, highlighted global research needs along the food chain, challenges for research in the field of food quality and safety, and opportunities for research where European actions are seen in the context of building a knowledge-based bioeconomy (KBBE) as a response to social and economic challenges. EU research addresses risk/benefit assessments, detection and monitoring of added substances, prevention of undesirable human health aspects, and improving food safety and quality as well as new and existing systems for tracing, identifying and enhancing the food supply-chain integrity. The European Technology Platforms identify barriers and opportunities; other tools include ERA-net Plus bridging measures and the European Metrology Research programme, which was run under article 168 of the treaty. For the FP7-KBBE-2009-3 call, a budget of 188,85 million is forecast. The call closed on 15 January, 2009.

Session 7: Chemical contaminants

The chemical contaminants session consisted of three presentations. The first was by Rainer Malish, who is the Head of the Community Reference Laboratory (CRL, Germany) for dioxins in food and feed, and for pesticides in food of animal origin. He gave an overview about the role of CRL and National Reference Laboratories (NRLs) in harmonizing food control and analytical methods, and quality throughout the EU. Ron Hoogenboom from RIKILT (the Netherlands) was instrumental in developing the application and validation of the CALUX bioassay for dioxin-like compounds in food and feed, and discussed its application and advantages as well as the essential quality control considerations for its use. This bioassay has been used to identify various food contamination incidents and provide a rapid screening tool to help with the risk assessment and risk management processes. Jana Hajslova (ICT Prague, Czech Republic) finished the session with a tour of analytical tools that have been developed in recent years including

GCGC-TOF-MS, DART and other new techniques, and their application in food. One of the conclusions from the session was that any efforts towards harmonization of food control must not inhibit scientific progress and advances.

Session 8: Microbiological contaminants

The speakers in this session, which was chaired by Wolfgang Kneiffel (BOKU, Austria) and Sue Paulin (ESR, New Zealand), gave insightful talks about their areas of microbiological expertise. Danillo Lo Fo Wong (WHO, China) started the session with a thorough overview of factors contributing to the emergence and re-emergence of zoonotic pathogens, and the consequences and problems facing both healthcare professionals and consumers. Gerhard Tangen (Oxoid Germany GmbH, Wesel, Germany) discussed the advantages of using molecular methodology, specifically the internationally validated BAXTM PCR system (DuPont Qualicon, Wilmington, DE, USA), for quick and accurate detection of *Salmonella* and *Campylobacter* in different food matrices. Stephen On (ESR, New Zealand) gave a comprehensive overview of the difficulties and challenges facing scientists in standardized detection and isolation of *Campylobacter* spp. in food and faecal samples. Finally, Mike Peck (IFR, UK) discussed the difficulties of recovering dormant food-borne pathogens, and the challenges faced in assessing their viability in food. In summary, it was clear that in order to maintain consumer confidence in the increasingly global diversity of food products and to maintain a high standard of food traded internationally, reliable and robust systems need to be developed that can detect emerging public health risks. Global harmonization and standardization of traditional and new or alternative and rapid detection and isolation methods is crucial to provide the consumer with high quality, safe food.

Session 9: Horizontal issues

Christoph von Holst (IRMM/JRC, Belgium), who was also the chair for this session, started by presenting guidelines for the validation of qualitative methods. MoniQA and the IUPAC aim to jointly establish internationally accepted guidelines for the validation of qualitative methods and the interpretation of results. Philippe Delahaut (CE, Belgium) gave a presentation on the key elements of immunochemical methods in food analysis, concluding that while

the classical microplate ELISA is the most commonly used test in laboratories. New (rapid) approaches are still needed although, immunological approaches have improved greatly control of foodstuff. Jacob de Jong (RIKILT, the Netherlands) introduced the EU-funded project CONFIDENCE in Food and Feed, which aims to provide long-term solutions for the monitoring of persistent organic pollutants, perfluorinated compounds, pesticides, veterinary pharmaceuticals, heavy metal, and biotoxins in high-risk products such as fish and fish feed, cereal-based food/feed, and vegetables. Finally, Miles Thomas from CSL (UK) presented on Rapid Alert Systems and Use of Databases in Food Safety. EU RASFF, which plays a vital role in ensuring food safety across Europe also demonstrates a proactive approach for consumers. In the future, global rapid systems will have increasing importance, within and outside of Europe. Rapid access to such data sets allows for early identification of emerging issues, prioritisation in research and development, and facilitates horizon scanning.

Satellite events

Before the conference, the MoniQA consortium meeting brought together the 32 partners to review progress. In addition, a MoniQA Food Scientist Training workshop on science communication was hosted by Siân Astley (IFR, UK) and Daniel Spichtinger (RTDS, Austria). The workshop covered issues such as 'why communicate?', communication in EU projects, different expectations amongs journalists and scientists, identifying stakeholders, public speaking, and other relevant issues. An international expert workshop on cost-benefit of food safety regulations was organized and hosted by Gerhard Schiefer and Melanie Fritz, from the University of Bonn. The workshop captured knowledge on the principle conditions found in food enterprises situations, their decision-making behaviour, and the impact-domains related to food safety activities in policy.

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