WMFmeetsIUPAC

by Hans van Egmond and Rudolf Krska

"WMFmeetsIUPAC" is a unique event, combining the 9th Conference of the World Mycotoxin Forum and the XIVth IUPAC International Symposium on Mycotoxins. It was held in Winnipeg, Canada, 6-9 June 2016. The conference built on the success of the previous edition, which was held in Rotterdam, the Netherlands (2012). The IUPAC symposia on Mycotoxins has existed since 1972. Traditionally, these symposia had a strong focus on (applied) chemistry and attracted in particular attendees from academia, research institutes, and government agencies. The World Mycotoxin Forum (WMF) is a younger series of conferences, organized since 2001 by Bastiaanse Communication. WMF conferences put more emphasis on issues such as prevention and control, and practical solutions for the food and feed industry receive a more prominent place in the conference programs compared to the IUPAC symposia.

Mycotoxins, produced by fungi, are an important class of natural toxins. They are of significant concern to the health of humans and animals. The conference WMFmeetsIUPAC aims to increase the awareness of human and animal health risks due to mycotoxins in food and feed, and of potential risk management options, technologies, and integrated strategies for minimized contamination. The Winnipeg conference attracted more than 400 attendees, representing 34 countries. With the support of renowned members of the International Advisory Committee, a program was built which included more than 100 invited lectures and oral contributions in two plenary meetings and 13 parallel sessions; speed presentations; over 130 posters; spotlight presentations, and an instrument/manufacturers exhibition.

After various welcoming words, Laura McConnell, Past President of the IUPAC Division on Chemistry and the Environment (Division VI), gave an inspiring introductory talk showing how IUPAC has evolved over a century, from an institution particularly focusing on nomenclature, standards, and norms into what it is today: an organization with a clear eye on present-day concerns such as globalization, energy crisis, and climate change. Following the introductory presentations, four respected keynote speakers set the stage by sharing their views on various contemporary mycotoxin issues in the perspective of a changing world.

The following days were characterized by a variety of parallel and poster sessions, which allowed conference participants to select the most appealing subject areas for attending and interacting with presenters. As a special end to the third day of WMFmeetsIUPAC, an exclusive dinner was organized for conference attendees in the new Canadian Museum for Human Rights, with its breathtaking architecture and its interactive exhibitions, a must-see in Winnipeg! The fourth and last conference day included the traditional ceremony of the IUPAC Best Poster Award. The winning poster "Optimal sampling and extraction procedures for ergot measurements" was prepared and presented by Taylor Grusie, Veterinary Biomedical Sciences, University of Saskatchewan, Canada.

At the close of the conference, a few upcoming international conferences of relevance to the audience were announced, including the next WMFmeetsIUPAC conference, which will be held in Austria, October 2019, the year of the IUPAC Centenary.

A post-conference activity was the visit to a nearby grain elevator. This excursion was facilitated by the Canadian Grain Commission, Canada's scientific research organization on grain quality. Participants gained an understanding of the operation of a commercial grain elevator and had the chance to learn about equipment and methods used in the Canadian grain industry for sampling whole grain, visually inspecting grain for grading factors related to fungal infection, as well as how industry manages and mitigates risks due to the presence of mycotoxins in grains.

From the various conference sessions and the subsequent discussions, five generalized "lessons" could be distilled, each broken down with information, observations and conclusions summarized and provided by the session chairs.

Canadian Museum for Human Rights in Winnipeg, where the conference dinner was held

Lesson 1: We are living in a changing world with new developments, changed attitudes, challenges, and chances.

- A changing world means: changes in technology, mycotoxin patterns, and dietary behavior.
- Climate change, including more extreme weather conditions, may mean that old problems may become new ones (*e.g.* ergot in western Canada).
- Large collaborative projects have been launched in various regions of the world to combat mycotoxins, with more involvement of Africa and Asia.
- Food authorities and international organizations work more towards proactive approaches than reactive approaches.
- Economic and human health costs associated with mycotoxins can be equated, but the methods for assessment are arbitrary.

Lesson 2: We need to consider that co-exposure to multiple mycotoxins and other contaminants is a reality.

- Recent mycotoxin surveys prove that co-occurrence of multiple mycotoxins, including modified forms, is the rule rather than the exception.
- Food authorities now recognize mycotoxin co-occurrence as a priority in exposure assessment.
- In vitro models for risk assessment still prevail, moving to in vivo models seems challenging.
- Different modes of action are a major challenge for toxicological evaluation.
- New technologies (such as High Content Analysis) may assist in assessing combined effects of various food contaminants.

Lesson 3: New advanced tools for sampling and analysis of mycotoxins offer opportunities to increase knowledge and understanding in various respects: "the numbers tell the tale".

- An on-line FAO sampling tool is now available to visualize effects of sampling plan parameters on the risk of mischaracterizing commodity lots.
- State-of-the-art MS methods lead to a clearer picture on the range of occurring (masked) fungal secondary metabolites.
- Innovative approaches for biomarker analysis (including blood spot analysis) provide new insights into the exposure of mycotoxins, their metabolism and the efficacy of detoxifiers.
- Omics technologies are becoming an important data source for improved risk assessment and better understanding of plant-fungi interactions.

Lesson 4: Success stories and promising techniques are stimulating elements in our further efforts to tackle mycotoxin problems.

- Expanding the application of biocontrol with atoxigenic Aspergillus technology in Africa has dramatically reduced aflatoxin contamination of maize.
- Using novel compounds, including natural products, may inhibit toxin production in the plant and may mitigate the physiological impact on intestinal tissue.
- Use of hyperspectral imaging or NIRT as non-invasive analytical techniques offer promise in sorting.
- A clear trend towards ICT-based tools, including novel handheld devices, allow on-line data provision via apps and instantaneous management decisions.

Lesson 5: Integrated approaches are the way forward to the effective and efficient reduction of mycotoxins in the food and feed chains.

- New approaches go beyond "field-to-fork" and consider the entire cycle, including waste management and alternative energy sources.
- Understanding the fungi's life cycle and its interaction with host and environment is of key importance in sustainable prevention strategies.
- Innovative post-harvest techniques, including novel milling, thermal processing, and detoxification techniques become increasingly attractive to minimize mycotoxin content.
- In order to be effective to avoid adverse health effects, mycotoxin regulations have to impact the whole food and feed chains.

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www.wmfmeetsiupac.org

Chemistry Education

by Datuk Dr. Soon Ting-Kueh

The 24th IUPAC International Conference on Chemistry Education (ICCE) 2016 was successfully organised by the Institut Kimia Malaysia (IKM), under IUPAC auspices, at the Borneo Convention Centre Kuching,