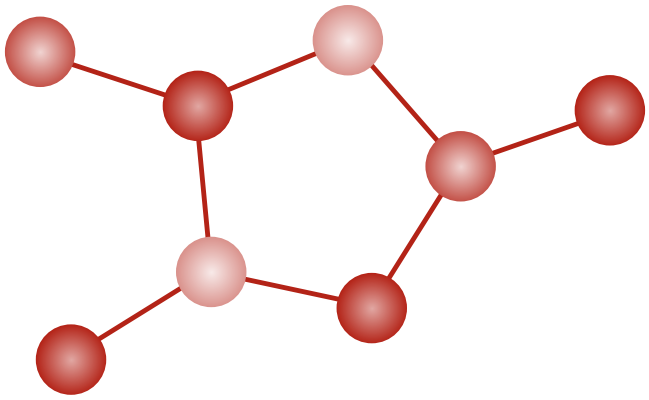
Mycotoxicology Newsletter



AN INTERNATIONAL FORUM FOR MYCOTOXINS

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PAST SYMPOSIA AND CONFERENCES

Speakers from leading European universities and research institutes shared their insights with attendees of the **4th International Symposium on Mycotoxins: Challenges and Perspectives** in Ghent, Belgium. The scientific program at the May 24, 2011, event provided a multi-disciplinary overview of major mycotoxicological issues, including updated risk assessment data from the European Food Safety Agency's (EFSA's) Panel on Contaminants in the Food Chain (CONTAM); the effects of mycotoxin exposure on human health; and management and testing strategies such as breeding of *Fusarium*-resistant grains, mycotoxin-detoxifying agents, and rapid testing for multiple mycotoxins.

The final program can be downloaded from the following website: http://www.polymer.ugent.be/pdfs/MYTOX%20FINAL%20PROGRAM.pdf

Germany's Society for Mycotoxin Research presented its **33rd Mycotoxin Workshop,** from May 30 to June 1, 2011, in the historic town of Freising near Munich. Appointees from the Hans Eisenmann-Zentrum and the Institute of Animal Hygiene of the Technische Universität München organized this year's program. The workshop's cross-disciplinary review of the latest developments in key research areas featured sessions on the occurrence of mycotoxins and toxigenic fungi in food and feed, health risks, toxicology, and analysis of various mycotoxin species.

More information on the Society for Mycotoxin Research is available on the following website: http://www.mykotoxin.de/docs/public/home.asp

The June 9–10, 2011, **MycoRed Russian Workshop: Reduction of Mycotoxins in Production Chains of EU and Russia: Modern Investigations and Practical Features** at Moscow's Russian Academy of Sciences drew 128 researchers, government regulators, and agribusiness professionals from Russia, Ukraine, Kazakhstan, Belarus, Armenia, Italy, the Netherlands, Hungary, Turkey, and South Africa. The event offered attendees a collaborative forum for discussing results of the MycoRed project, comparing mycotoxin risk assessment and control strategies, and developing joint research proposals. The workshop sessions focused on the impact of physiologic and climatic factors on mycotoxin occurrence, the health effects of mycotoxin-contaminated food and feed, improved sampling procedures, and emerging analytical methods.

For a summary of the workshop program, see the following website: http://eng.fp7-bio.com/

The agenda at this summer's **Gordon Research Conference (GRC) on Mycotoxins and Phycotoxins: Discovery and Risk Management of Harmful Biotoxins** at Colby College in Waterville, Maine, included a special preliminary event for early-career scientists. The June 9–10, 2011, **Gordon Research Seminar** offered graduate students and post-docs a relaxed, supportive, and stimulating environment for sharing creative ideas, reporting on the progress of their research projects, and networking with potential mentors. This year's participants included three young mycotoxin researchers who gave presentations entitled The Role of AtfB-mediated Regulation of the Aflatoxin Biosynthetic Cluster; Functional Testing of Barley and *Brachypodium distachyon* UDP-glucosyltransferases for Their Ability to Inactivate Deoxynivalenol by Heterologous Expression in Yeast; and Ecology of Growth and T-2 and HT-2 Toxin Production by *Fusarium langsethiae* Strains. A career panel moderated by an international team of distinguished biotoxin researchers concluded the seminar.

Detailed information about the seminar series is available at the following URL: http://www.grc.org/grs.aspx

The subsequent June 12th–17th sessions at the 15th GRC provided seminar participants with additional opportunities to meet and learn from leading authorities in their field. The program of expert presentations covered the following research areas: (1) novel toxins and toxicities, (2) molecular mechanisms of toxicity and detoxification, (3) public health effects/disease epidemiology, (4) the social and economic repercussions of biocontamination, (5) genetic and environmental control of toxigenesis, (6) physiological and ecological roles of toxins, (7) analytic advances and predictive modeling, (8) risk assessment and strategies for prevention and control, and (9) the impact of climate change on mycotoxin occurrence and the future of biotoxin research.

More information on this year's conference schedule is available at the GRC website: http://www.grc.org/programs.aspx?year=2011&program=mycotoxins

Participants in the June 19–24, 2011, ***Fusarium* Laboratory Workshop** at Kansas State University (KSU), in Manhattan, Kansas, received hands-on instruction in morphological, genetic, and molecular biological techniques of identifying standard strains of *Fusarium* from eight leading experts in the field. The workshop's extensive schedule of lab sessions enabled students to practice a variety of advanced analytic techniques, including testing for vegetative compatibility groups (VCGs) and cross-fertility; strain purification, real-time PCR DNA amplification, and DNA sequencing. Lectures on various *Fusarium* species and related mycotoxins, including trichothecenes, fumonisins, and zearalenone; *Fusarium* genomics; and related topics rounded out the program.

To learn more about KSU's department of plant pathology visit its website: http://www.plantpath.ksu.edu

This year's 125th AOAC Annual Meeting and Exposition took place in New Orleans, Louisiana, from September 18th through the 21st. The program featured poster sessions, expert presentations, and roundtables on the latest advances in the detection and analysis of food-borne contaminants. Discussions of particular interest to mycotoxicologists and other members of the food safety community included the following:

- Proficiency Test for Simultaneous Determination of Up to Eleven Mycotoxins in Maize by Using LC-MS/MS Methodology
- Challenges in Masked Mycotoxin Analysis
- Multi-residue Method for Simultaneous Analysis of 45 Mycotoxins in Grapes, Raisins, and Wine
- Development and Validation of Multi-detection Method for Simultaneous Analysis of Pesticides and Mycotoxins in Food

Other event highlights included an address entitled Partners in Research Exceed the Sum of the Parts by this year's Harvey Wiley Award winner, Steven J. Lehotay. A lead chemist at the Eastern Regional Research Center of the USDA Agricultural Research Service, in Wyndmoor, Pennsylvania, Lehotay received the award for his contributions to the progress of simple, robust, and cost-effective rapid test methods for chemical residues in food.

Additional details on the program are available on the AOAC website: http://www.aoac.org/meetings1/125th_annual_mtg/main_2.htm

Agribusiness and consumer representatives exchanged viewpoints on food safety with scientists, socio-economists, and government regulators at the third international conference of the EU-funded Monitoring and Quality Assurance in the Food Supply Chain (MoniQA) project in Varna, Bulgaria. The interdisciplinary program of the September 27–29, 2011, **Food Safety and Consumer Protection Conference** addressed the effects of increasing awareness of agricultural contaminants and other food-related hazards on consumer confidence, as well as the progress of scientific, government, and industry risk reduction efforts.

In addition to a keynote address on mycotoxin issues in Bulgaria, the scientific program's coverage of topics of interest to mycotoxicological researchers and their industry partners included the following presentations:

- Production of Citrinin-Free Red Pigments of *Monascus* Yeast
- Proficiency Testing for LC-MS/MS Simultaneous Determination of Up to Eleven Mycotoxins in Maize
- Effects of Processing on *Fusarium* Toxins in Traditional Turkish Maize-based Foods (Bread, Halva, Kuymak)

The final conference session on September 29th was devoted to the launch of the MoniQA Association, the successor organization to the MoniQA consortium. The new group will carry on the original consortium's work as a global network for sharing leading-edge food safety expertise, research data, and training and laboratory resources. Since the MoniQA Association's August 2011 registration as a nonprofit corporation under Austrian law, its membership has grown to more than 500 experts from nearly 40 countries. As stakeholders in MoniQA's mission of ensuring the quality and safety of the global food supply, partner organizations actively promote the development and worldwide adoption of harmonized food safety regulations and standardized monitoring and control strategies. MoniQA's key achievements and ongoing initiatives include the organization of international scientific conferences and educational outreach programs; development of reference/testing materials and guidelines for laboratory validation studies; assessment of the socioeconomic consequences of evolving food safety regulations; validation of new analytic protocols; and dissemination of knowledge through multiple channels, including a newsletter, a peer-reviewed journal (*Quality Assurance and Safety of Crops & Food*), and various online sources.

On the following day, MoniQA's newly elected Supervisory Board took office at the Association's First General Assembly. The Board's President, Dr. Angelo Visconti, Director of the Institute of Sciences of Food Production (ISPA), National Research Council of Italy; Deputy President, Dr. Bert Popping, Director of Scientific Development of Germany's Eurofins CTC/Analytik GmbH; and Secretary General, Dr. Ronald Poms, Secretary General of the International Association for Cereal Science and Technology in Austria will serve alongside Paul Finglas, a lead researcher at the Institute of Food Research in the United Kingdon; Dr. Wolfgang Kneifel of Austria's Universität für Bodenkultur Wien (BOKU); and senior scientist Hans P. Evan Egmond of RIKILT- Institute of Food Safety of the Wageningen University and Research Center in the Netherlands.

For additional details about the Varna conference see the following Web page: http://varna2011.moniqa.org/**; more information on the MoniQA Association and its activities is available on the organization's website:** http://association.moniqa.org

Food science and medical professionals, agribusiness executives, and other stakeholders in the international food safety community convened in Istanbul, Turkey, for the October 10–14, 2011, 2nd ISM-MycoRed Mediterranean Workshop on Mycotoxicological Risks in Mediterranean Countries: Economic Impact, Prevention, Management, and Control. A satellite event of the TUBITAK Marmara Food Institute's 4th International Congress on Food and Nutrition and the 3rd SAFE Consortium International Congress on Food Safety, the workshop featured expert presentations by prominent mycotoxin researchers from the Southern and Eastern Mediterranean Basin. Updates on *Fusarium* toxins included the latest occurrence data, current regulations for local foods and export commodities, and new insights into trichothecene biosynthesis and the emerging risks of fumonisin B_2 in the grape chain. Sessions on mycotoxin prevalence, molecular detection method, regulatory policies, and post-harvest control strategies rounded out the workshop program.

For more information, see the workshop website: http://www.tubitaksafe-food2011.org/

OTHER SYMPOSIA AND MEETINGS

Additional information on the following fall events, including details of the conference schedules and scientific programs, is available on their respective websites.

- **October 19–22, 2011: Power of Fungi and Mycotoxins in Health and Disease,** Primosten, Croatia

  October 21st (Day 3 of the symposium): **Roundtable Discussion on Mycotoxins in Food and Feed – Mycotoxins as Economic and Health Hazards**

  Event website: http://www.hmd-cms.hr/power-of-fungi

- **October 25–28, 2011: MoniQA Food Scientist Training on Mycotoxins, Determination of *Fusarium* Toxins by HPLC, LC-MS/MS and Rapid Techniques,** Ankara, Turkey

  Event website: https://www.moniqa.org/node/2209

- **November 1–4, 2011: RAFA 2011 – International Symposium on Recent Advances in Food Analysis,** Prague, Czech Republic

  Event website: http://www.rafa2011.eu/

- **November 15–18, 2011: MycoRed-ISM 2011 South and Central America Conference – Strategies to Reduce the Impact of Mycotoxins in Latin America in a Global Context,** Mendoza, Argentina

  Event website: http://www.mycored2011.com.ar/

NEWS FROM INTERNATIONAL AGENCIES

For more information on the mycotoxin surveillance, risk assessment, or regulatory development projects summarized below please visit the relevant project's website or download the pdf version of the full report.

European Food Safety Authority's (EFSA)

February 2, 2011, Scientific Opinion on the Safety and Efficacy of Bentonite as a Feed Additive for All Animal Species (http://www.efsa.europa.eu/en/efsajournal/pub/2276.htm) The EFSA's Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) has concluded that a supplementary dossier on the mycotoxin absorbent bentonite (dioctahedral montmorillonite) failed to establish the compound's efficacy as an aflatoxin binder for all animal species due to the absence of appropriate *in vivo* data. In their report, FEEDAP members also reiterated their earlier conclusion that the additive poses no significant risk to animal health or the environment and extended their approval of its use for dairy cows to all ruminants.

June 24, 2011, Scientific Opinion on the Public Health Risks of Zearalenone Contamination (http://www.efsa.europa.eu/en/efsajournal/doc/2197.pdf)

This CONTAM Panel report assesses the potential public health risk of higher zearalenone limits for breakfast cereals. According to the Panel members, new maximum limits (ML) of 75, 100, 125, or 150 µg/kg would be unlikely to raise consumers' zearalenone intakes above the current TDI of 0.25 µg/kg bw, unless the same batch of breakfast cereals containing zearalenone at the ML were consumed daily every day for 2 to 4 weeks.

Food Standards Agency (FSA) Ergot Survey

The FSA has initiated the first formal program for monitoring the content and pattern of ergot alkaloids and ergot sclerotia in the EU cereals. Ergot sclerotia are parasitic fungal structures that replace seeds and kernels in flowering cereal grains and grasses infected by windborne *Claviceps* mold spores. In addition to reducing crop yields, ergot sclerotia contain high concentrations of toxic alkaloids. Six major alkaloids, ergometrine, ergotamine, ergosine, ergocristine, ergocryptine, and *ergocornine,* and their nine isomers have been targeted for the study. The recent development of a validated HPLC/MS/MS method for determining ergot in raw and processed cereals will enable FSA researchers to not only accurately measure individual alkaloid levels but also compare differences in toxicity between the various alkaloids and their isomeric forms. Ingestion of ergot toxins can cause severe gastrointestinal and central nervous system effects, gangrene, and death in animals and humans.

Since the mid-1990s, a resurgence in ergot diseases in growing regions around the world has prompted increased international concern about the acute and chronic effects of ergot consumption in humans and animals. At present, EU regulations restrict the level of ergot-contaminated rye grains in animal feed containing unground cereals to 0.1%. While rye remains the most significant source of risk exposure, the U.K.'s Department for Environment, Food and Rural Affairs (DEFRA) has reported that the incidence of ergot-contaminated wheat has also risen in recent years. Although EU intervention wheat is subject to legal limits of 0.05%, there are currently no international standards for controlling ergot levels in consumer products. The results of the FSA survey will help lay the groundwork for EU efforts to develop appropriate ergot risk control measures for food and feed.

Details of the FSA's ongoing mycotoxin surveillance efforts are available on the organization's website: http://www.food.gov.uk

Updates from the Codex Alimentarius Commission's Committee on Contaminants in Foods

33rd Session, Geneva, Switzerland, July 5 9, 2010
(http://www.codexalimentarius.net/web/archives.jsp?year=10)

The delegates' decisions on new and amended mycotoxin control measures included the following directives:

- Suspend work on the Proposed Draft Maximum Levels for Fumonisins in Maize and Maize Products and Associated Sampling Plans pending a full JECFA evaluation of all updated occurrence and toxicology data.
- Add a paragraph to the Additional Measures for Brazil Nuts of the Draft Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Tree Nuts recommending that harvested Brazil nuts be dried to reduce the water activity level to 0.70, preferably within 10 days of collection.
- Set maximum aflatoxin limit of 10 µg/kg for shelled, ready-to-eat Brazil nuts and 15 µg/kg for shelled Brazil nuts intended for further processing.
- Integrate recommended sampling practices for total aflatoxins in Brazil nuts into the sampling plans for aflatoxin contamination in ready-to-eat tree nuts and tree nuts destined for further processing.

5th Session, The Hague, the Netherlands, March 21–25, 2011
(http://www.codexalimentarius.net/web/archives.jsp?year=11)

Committee members agreed to proceed with the following actions:

- Continue drafting discussion papers on pre- and post-harvest management of relevant mycotoxins in sorghum.
- Begin developing a Code of Practice for minimizing levels of ochratoxin A in cocoa.
- Redraft proposed maximum levels for DON and its acetylated derivatives in cereals and cereal-based products.
- Develop a sampling plan for a maximum limit of 10 µg/kg total aflatoxins in dried figs.

PUBLICATIONS

Liquid Chromatography for the Determination of Mycotoxins in Foods, R. Romero-González, J. L. Martínez Vidal, A. Garrido Frenich, Nova Science Publishers: Food Science and Technology Series: January 2011.

Co-authored by three analytic chemists from Spain's Almeria University, this book advocates for increased use of cutting-edge techniques such as LC-MS/MS for laboratory analysis of mycotoxins, citing the superior efficiency and sensitivity of techniques that combine mass analysis and physical separation capabilities.

Mass Spectrometry in Food Safety: Methods and Protocols, Jerry Zweigenbaum (Ed.), Humana Press: June 2011.

This overview of recent advances in food safety technologies discusses the benefits of emerging applications for increasing the sensitivity, selectivity, and precision of contaminant testing. Written in the highly successful Methods in Molecular Biology™ series format, the book's detailed descriptions of the latest LC-MS techniques include easily reproducible laboratory protocols and timesaving troubleshooting tips. Contributing experts explain each analytic method in the context of current regulatory standards and other relevant issues.

Advances in Environmental Health Effects of Toxigenic Mold and Mycotoxins, Ebere Cyril Anyanwu, Nova Science Publishers: Health and Human Development: March 2011.

The authors' extensive cross-disciplinary expertise in clinical neurophysiology and environmental mycotoxicology informs this authoritative and balanced assessment of the health risks of chronic exposure to toxic molds and mycotoxins. Anyanwu rigorously documents their toxic effects on animals and humans with substantial evidence from peer-reviewed literature. The author's argument for the exceptional scientific relevance of mycotoxicological research extends beyond the standard warnings about the dangers of exposure to fungal toxins. His thought-provoking claim that deeper insight into their metabolism and toxicity could advance the discovery of safer, more effective medications adds a positive dimension to the on-going debate about the significance of mycotoxin as an environmental health issue.

Poisoning by Plants, Mycotoxins, and Related Toxins, James Pfister, Terrie L. Wierenga, Franklin Riet-Correa, Ana Lucia Schild (Eds.), CABI: September 2011.

This collection of 124 presentations from the 2009 International Symposium on Poisonous Plants (ISOPP8) covers key developments in recent research on toxic plants, mycotoxins and other toxins. Topics include the impact of various toxin species on the nervous systems and organs of laboratory and farm animals, the medicinal properties of their chemical components, and toxin detection and control strategies.

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The editor, Dr. Michelangelo Pascale, is a researcher at the Institute of Sciences of Food Production (ISPA), part of the Italian National Research Council (CNR). ISPA is recognized as one of the world's foremost institutes for the study of the chemistry and the biology of mycotoxins and mycotoxin-producing fungi. Dr. Pascale is currently group leader of ISPA's department of Food Safety and Innovative Methods for Food Analysis and a participant in several national and international mycotoxin projects. He is also the president of Safe Wheat S.R.L., a spin-off company of the CNR.

The editor welcomes submissions of newsworthy information about mycotoxins, including the dates of upcoming conferences of interest. He can be contacted at the following address:

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