

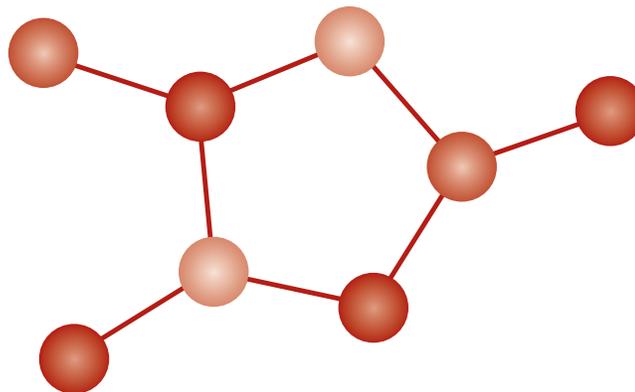
# Mycotoxicology Newsletter

AN INTERNATIONAL FORUM FOR MYCOTOXINS



Produced in association with the  
International Society for Mycotoxicology

[www.mycotoxology.org](http://www.mycotoxology.org)  
2013, Volume XVI, Issue 1



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## PAST SYMPOSIA AND CONFERENCES

► The September 30 – October 3, 2012, program of the **126<sup>th</sup> AOAC International Annual Meeting & Exposition** in Las Vegas, Nevada, featured two sessions of interest to mycotoxin researchers and other stakeholders in the global food safety community. On day 2 of the conference, a session entitled Rapid Point-of-Sampling Tests for Mycotoxins included talks on the pros and cons of commercial immunoassay kits for food contaminants, materials used to test various toxins, and the Official Mycotoxin Testing Program for the USDA Grain and Method Performance Evaluation, as well as an assessment of rapid test kits for aflatoxins in maize, a field survey of kits used in the grain industry, and an oral poster presentation on indirect competitive enzyme-linked immunosorbent assay analysis of fumonisin B<sub>1</sub> and aflatoxin B<sub>1</sub> in stored sorghum. The day 4 session, Analytical Challenges in Masked Mycotoxin Research, covered topics ranging from analytical methodology and masked mycotoxin occurrence in food and feed to deoxynivalenol and deoxynivalenol-3-glucoside evolution in baked goods production exploiting design of experiments and LC-MS/MS strategies; hidden fumonisins; and high-resolution LC-Orbitrap MS detection of masked mycotoxins. An oral poster presentation addressed the use of automated online turbulent-flow high-resolution Orbitrap mass spectrometry to determine mycotoxins in animal feed.

Details of the program are available on the following web page:  
[http://www.aoc.org/meetings/1/126th\\_annual\\_mtg/main\\_2.htm](http://www.aoc.org/meetings/1/126th_annual_mtg/main_2.htm)

► Day 2 of the October 10–13, 2012, **World Nutrition Forum** in Singapore featured a series of presentations on mycotoxins. Four of the seven talks focused on fumonisins, highlighting issues ranging from their impact on livestock, detoxification, and the development of biomarkers to the role of climate change. Discussions of the effects of mycotoxin regulations on international trade, masked mycotoxins, and recent research advances in Japan rounded out the program.

The complete scientific program is available on the forum website:  
<http://www.worldnutritionforum.info/wnf/index.html>

► The Mediterranean Phytopathological Union's (MPU's) first international workshop, **Plant Protection for the Quality and Safety of the Mediterranean Diet**, took place from October 24<sup>th</sup> through the 26<sup>th</sup> in Bari, Italy. The scientific program featured a wide variety of talks by noted mycotoxin researchers. The speakers discussed mycotoxin occurrence in wheat, figs, ethnic foods, and other commodities; emerging biocontrol agents and novel control strategies; genetic and biodiversity studies; safety concerns during food processing; and the ongoing efforts of MycoRed, the International Society for Mycotoxicology, and other scientific organizations to improve Mediterranean food quality and safety. Highlights of the program included invited lectures on a variety of timely issues:

- Disease and Pest Management in Holistic Sustainable Production
- Food Safety and Security: Role of Plant Disease Management at the Field Level
- Plant Bioactive Compounds for the Control of Fruit Post-harvest Diseases
- Biologic Control Strategies for Mediterranean Basin Crops
- Does Chlorogenic Acid Affect Deoxynivalenol Accumulation in Maize Kernels Infected by *Fusarium Graminearum*?
- Main Toxicogenic Fungi and Related Mycotoxin Risks in the Mediterranean Area
- Novel Strategies in Post-harvest Management
- Strategies for Improving Quality and Safety in Food Processing
- Economic Impact of Mycotoxin Contamination in Dried Fruit

To download the complete scientific program, visit the MPU website:  
<http://MPU2012.ba.cnr.it>

► The November 5–9 2012, **WMFmeetsIUPAC** event in Rotterdam, the Nether-

lands, was a joint effort of the 7<sup>th</sup> Conference of the World Mycotoxin Forum and the 13<sup>th</sup> IUPAC International Symposium on Mycotoxins and Phycotoxins to advance their shared aims. Parallel sessions at the conference offered expert insights on an extensive range of mycotoxin issues: emerging toxins and new occurrence data, human and animal health implications, prevention and reduction, the latest analytical solutions, sampling and novel analytical tools, news from the MycoRed project on novel integrated strategies for worldwide mycotoxin reduction, factors affecting toxin formation, airborne exposure to mycotoxins, development and validation of monitoring and quality assurance methods, inexpensive detection methods, and genomic approaches to mycotoxin management. The program also included a plenary meeting on emerging challenges, keynote lectures by noted mycotoxin experts, and a panel discussion on the significance of natural toxins in a changing world and their impact on industry, regulatory bodies, and academia. A series of six workshops on innovative analytic technologies provided additional educational opportunities for attendees.

Details of the meeting are available on the meeting website: <http://www.wmfmeetsiupac.org/html/welcome.asp>

## FUTURE SYMPOSIA AND MEETINGS

► February 26 – March 1, 2013, 4<sup>th</sup> MONIQA International Conference: Food Safety Under Global Pressure of Climate Change, Food Security, and Economic Crises, Budapest, Hungary (Sessions on Mycotoxins – Climate Change, Avoidance, Reduction, Exposure and Analysis, Mycotoxins – Harmonizing Regulations, and a GHI Working Group Meeting), website: <http://budapest2013.moniqa.org/>

► May 7–10, 2013, EuroFoodChem XVII, Istanbul, Turkey (Session on Mycotoxins – Analytical methods and Effects of Food Processing, chaired by Dr. Angelo Visconti) website: [www.eurofoodchemxvii.org](http://www.eurofoodchemxvii.org)

► May 22–24, 2013, 35<sup>th</sup> Mycotoxin Workshop, Ghent, Belgium, website: [http://www.mycotoxin.de/docs/public/tmplnt\\_article.asp?CntID=64&PCat\\_ID=1&Lang=EN](http://www.mycotoxin.de/docs/public/tmplnt_article.asp?CntID=64&PCat_ID=1&Lang=EN)

► May 27–31, 2013, ISM-MycoRed International Conference Europe 2013: Global Mycotoxin Reduction Strategies, Martina Franca, Apulia, Italy, website: <http://mycoredeurope2013.mycorede.eu/index.php>

## NEWS FROM INTERNATIONAL AGENCIES

The March 26–30, 2012, agenda of the 6<sup>th</sup> Session of the Codex Committee on Contaminants in Foods in Maastricht, the Netherlands, included updates on the progress of the development of proposed draft maximum levels (MLs) and codes of practice for several mycotoxins. After further consideration of these issues, the Committee agreed to take the following actions:

- Continue development of proposed draft MLs for deoxynivalenol (DON) in cereals and cereal-based products and associated sampling plans.
- Forward the proposed draft ML of 10 µg/kg total aflatoxins for dried figs including the sampling plan to the 35<sup>th</sup> Session of the Codex Alimentarius Commission.
- Suspend work on proposed draft MLs of fumonisins in maize pending consideration of a discussion paper on the need for control strategies beyond those detailed in the *Code of Practice for Prevention and Reduction of Mycotoxin Contamination in Cereals*.
- Begin work on an annex to the *Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals* that addresses the management of aflatoxins and ochratoxin A (OTA) in sorghum.
- Initiate development of a code of practice for the prevention and reduction of OTA in cocoa.
- Prepare a discussion paper on aflatoxins in cereals for the next session.

A report outlining these decisions was presented at the 35<sup>th</sup> Session of the Joint FAO/WHO Food Standards Program Codex Alimentarius Commission in Rome, Italy. Results of the July 2–7, 2012, meeting included adoption of the proposed draft ML of 10 µg/kg for total aflatoxins in dried figs (including sampling plan). The Commission also agreed that work should proceed on the development of good practices for

the control of OTA contamination in cocoa and of aflatoxins and OTA in sorghum.

Reports on these meetings can be downloaded from the following page on the Codex website: <http://www.codexalimentarius.org/meetings-reports/en/?sortingDate=012012>

The European Scientific Opinion on ergot alkaloids in food and feed, *EFSA Journal* 2012; 10(7):2798 [158 pp.]

This EFSA risk assessment focused on the *Claviceps purpurea* ergot alkaloids (EAs) (i.e., ergometrine, ergotamine, ergosine, ergocristine, ergocryptine, ergocornine, and the corresponding –inine epimers). Based on the results of 13-week study of the vasoconstrictive effects of ergotamine in rats, the CONTAM Panel established a group acute reference dose of 1 µg/kg body weight (b.w.) and a group tolerable daily intake of 0.6 µg/kg b.w. per day. Data on human ergot consumption raised no significant concerns about the risk of exceeding the tolerable level in any population subgroup. The panel noted, however, that exposure to harmful EA levels from food groups not included in this study is a possibility that should be considered. Exposure estimates for livestock indicated that their risk of toxicosis is low. The panel's opinion took into account 20,558 analytical results for EAs in 1,716 food, 496 feed, and 67 unprocessed grain samples.

The complete article can be downloaded from the EFSA website: <http://www.efsa.europa.eu/en/efsajournal/pub/2798.htm>

Food Standards Agency, April 2012 Research: Investigation into the apparent loss of fumonisins during food processing

This study was prompted by previous research showing that conventional analytic technology failed to detect fumonisins in food after certain types of processing. The new FSA investigation has determined that the fumonisins that appeared to have been removed by processing were in reality converted to a hydrolyzed form or were bound to food ingredients. The actual fumonisin concentrations in these processed foods were therefore higher than the levels detected by conventional test methods; however, the levels were below the current EU limits. The FSA noted that more research is needed to assess the toxicity of hydrolyzed and bound fumonisins and their implications for food safety.

More details of the FSA's findings are available on the agency's website: [http://www.food.gov.uk/news-updates/news/2012/may/research-april#\\_UMHbz16c90g](http://www.food.gov.uk/news-updates/news/2012/may/research-april#_UMHbz16c90g)

The AOAC Mycotoxins Community has launched a website with information about upcoming meetings and links to relevant publications, organizations, and educational materials.

The site can be accessed at the following URL: <http://www.mycotoxine.de/MC.html>

## REGULATORY UPDATES

Commission Regulation (EU) No 1058/2012 amends the maximum level for aflatoxins in dried figs set in Regulation (EC) No 1881/2006. The November 12, 2012, EU legislation changes the MLs of 2 µg/kg for aflatoxin B<sub>1</sub> and 4 µg/kg for total aflatoxins in dried ready-to-eat figs to 6 µg/kg and 10 µg/kg respectively. In dried figs for further processing the MLs of 5 µg/kg for aflatoxin B<sub>1</sub> was changed to 6 µg/kg; the 10 µg/kg ML for total aflatoxins was retained. The decision to amend the regulation took into account new information on the use of good practices to reduce aflatoxin concentrations and updated scientific data indicating that the higher MLs would pose no significant risk of increased aflatoxin exposure in humans.

The regulation can be downloaded from the following URL: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:313:0014:0015:EN:PDF>

Commission Regulation (EU) No 594/2012 of July 5, 2012, amends the maximum levels for ochratoxin A set in Regulation (EC) 1881/2006 as follows: The maximum level in wheat gluten has been increased to 8 µg/kg. The limits for spices, pepper, ginger, nutmeg, and turmeric are now 15 µg/kg.

The regulation can be downloaded from the following URL: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:176:0043:0045:EN:PDF>

## PUBLICATIONS

**“Systematics, phylogeny, and trichothecene mycotoxin potential of *Fusarium* head blight cereal pathogens,”** T. Aoki, T.J. Ward, H.C. Kistler, and K. O'Donnell, *Mycotoxins* (2012) 62 (2): 91–102.

Based on a series of studies of *Fusarium* head blight pathogens conducted over the past decade, the authors propose that *Fusarium graminearum* comprises at least 16 phylogenetically distinct species that developed as a result of population dispersal to different geographical regions. The authors note the importance to their research of a validated multilocus genotyping assay for determining species and predicting trichothecene toxin chemotype.

**“Signal amplification using colloidal gold in a biolayer interferometry-based immunosensor for the mycotoxin deoxynivalenol,”** C.M. Maragos, *Food Additives and Contaminants: Part A* (2012) 29 (7): 1108–1117.

The author of this study used a primary antibody-colloidal gold conjugate to amplify the signal of a biolayer interferometry-based biosensor. The improved signal made it possible to use the BLI biosensor for rapid quantitative and qualitative testing of deoxynivalenol in wheat. The quantitative assay compared favorably ( $r^2 = 0.9698$ ) with a reference chromatographic method for 40 naturally contaminated wheat samples. The qualitative assay accurately classified the same 40 samples as either above or below a 0.5 mg/kg threshold.

**Special Issue: Masked Mycotoxins**, edited by Sarah De Saeger and Hans P. van Egmond, *World Mycotoxin Journal* (2012), Volume 5, Number 3.

This special issue on masked mycotoxins discusses the occurrence of various mycotoxins and their masked forms in food and feed products, including masked deoxynivalenol in Chinese wheat; emerging test methods; the effects of extrusion cooking on fumonisin B<sub>1</sub> in maize, and other relevant topics.

**Special Issue: Mycotoxins in Food and Feed, Toxins**, Wayne L. Bryden (Guest Ed.), [www.mdpi.com/journal/toxins](http://www.mdpi.com/journal/toxins).

A selection of papers on topics including mycotoxin occurrence in feed in Europe and Africa are now available for downloading from this open access journal.

To access published papers from this special issue visit the following web page: [http://www.mdpi.com/journal/toxins/special\\_issues/mycotoxins-food](http://www.mdpi.com/journal/toxins/special_issues/mycotoxins-food)

**“Determination of HT-2 and T-2 toxins in oats and wheat by ultra-performance liquid chromatography with photodiode array detection,”** M. Pascale, G. Panzarini, and A. Visconti, *Talanta* (2012) 89: 231–236.

The authors used a newly developed rapid ultra-performance liquid chromatographic (UPLC) method to simultaneously determine HT-2 and T-2 toxins in oats and wheat at a  $\mu\text{g kg}^{-1}$  level. Following extraction with methanol/water (90:10, v/v) and immunoaffinity column cleanup, HT-2 and T-2 toxins were separated and quantified by UPLC with photodiode array (PDA) detector ( $\lambda=202$  nm) in less than 5 minutes. Mean recoveries from blank oats samples spiked with HT-2 and T-2 toxins at levels of 50–1000  $\mu\text{g/kg}$  ranged from 87% to 96%, with relative standard deviations (RSDs) lower than 7%. Mean recoveries from wheat spiked with HT-2 and T-2 toxins at levels of 25–100  $\mu\text{g/kg}$  ranged from 91% to 103%, with RSDs lower than 5%. The limit of detection for the method was 8  $\mu\text{g/kg}$  for both toxins (signal-to-noise ratio 3:1).

**“Developments in mycotoxin analysis: An update for 2010–2011,”** G.S. Shephard, F. Berthiller, P. Burdaspal, C. Crews, M.A. Jonker, R. Krska, S. MacDonald, R.J. Malone, C. Maragos, M. Sabino, M., Solfrizzo, H.P. Van Egmond, and T.B. Whitaker, *World Mycotoxin Journal* (2012) 5: 3–30.

This update reviews developments in mycotoxin analysis and sampling over a period between mid-2010 and mid-2011. Although the main focus is on conventional test methods linked to novel cleanup protocols, the article also touches on the major mycotoxins: aflatoxins, *Alternaria* toxins, ergot alkaloids, fumonisins, ochratoxin, patulin, trichothecenes, and zearalenone.

## BOOKS

***The Chemistry of Mycotoxins - Progress in the Chemistry of Organic Natural Products Vol. 97*** (2013 Ed.), Stefan Bräse, Franziska Gläser, Carsten Kramer, Stephanie Lindner, Anna M. Linsenmeier, Kye-Simeon Masters, Anne C. Meister, Bettina M. Ruff, and Sabilla Zhong, Springer: November 30, 2012.

This volume provides a comprehensive overview of the chemistry of the major classes of mycotoxins and discusses their biological impact. The book is organized in sections that focus on mycotoxin classes and/or structural classes (e.g., resorcinyl lactones, diketopiperazines).

***Mycotoxins: Properties, Applications, and Hazards***, Bryan J. Melborn and Jason C. Greene (Eds.), Nova Science Publishers: January 2012.

The editors present a collection of timely studies on the properties, applications, and hazards of mycotoxins from research organizations around the globe. Topics include biological strategy to prevent fumonisin contamination, the impact of deoxynivalenol on human cells, electroanalytical properties of mycotoxins and their determinations in the agroalimentary system, the chemistry and biology of mycotoxins from the rice false smut pathogen, the QuChERS method for the extraction of trichothecenes in coffee and spices, and deoxynivalenol quantification in human urine.

***Mycotoxicoses in Animals Economically Important***, Edlayne Gonzalez, Joana D'Arc Felicio, and Simone Aquino (Eds.), Nova Science Publishers: April 2012.

This volume covers mycotoxicoses in various livestock species, including horses, poultry, and swine and discusses related topics such as the nutritional effects of mycotoxins and mycotoxin control methods.

**Safety Evaluation of Certain Contaminants in Food**, Joint FAO/WHO publication WHO Food Additives Series No. 63/ FAO JECFA Monographs 8, 2011 (pp. 319–485).

The exhaustive look at deoxynivalenol (DON) provided in a lengthy addendum to this monograph includes biological data, toxicological studies, research on DON's effects in humans, and descriptions of analytic methods.

The monograph can be downloaded from the following URL: [http://apps.who.int/iris/bitstream/10665/44520/1/9789241660631\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/44520/1/9789241660631_eng.pdf)

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## ABOUT THE EDITOR

► 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.

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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