

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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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,

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Kuching, Sarawak, Malaysia, 15–20 August 2016. At the same time and while celebrating its 30th anniversary, the Institut Kimia Malaysia (IKM) Sarawak Branch held the International Symposium on Pure and Applied Chemistry (ISPAC), in conjunction with ICCE 2016 and with the support of the Foundation of Interaction of Science and Technology (FIST), Japan.

The ICCE is a major international chemistry education conference held biennially all over the world. It usually attracts a large number of chemistry and science educators, practitioners and researchers, and education decision and policy makers, including heads of education and research institutions from around the globe. ICCE-2016 ranked among one of the largest ICCEs, with 456 registered delegates including 260 foreign delegates representing 38 countries. Of course, the Malaysian delegation was the biggest, at 196, followed by Japan (109), India (15), Taiwan (14), China (13), and Australia (10). 50 teachers from Sarawak schools were provided with complimentary registration under the Tan Sri Law Hieng Foundation and the Lee Foundation. IKM also supported 14 teachers from Peninsular Malaysia with a grant of RM 1,500 each to enable them to participate in ICCE 2016.

The Chief Minister of Sarawak, YAB Datuk Patinggi Tan Sri (Dr.) Haji Adenan Bin Haji Satem, officiated the Opening Ceremony of ICCE and ISPAC 2016 at the Borneo Convention Centre Kuching, Kuching, Sarawak on Tuesday, August 16, 2016

Highlights

One of the highlights of ICCE & ISPAC 2016 was the presence of the 2010 Nobel Laureate in Chemistry, Ei-ichi Negishi, from Purdue University, USA. Professor Negishi delivered two plenary lectures, one at ICCE 2016 and the other at ISPAC 2016.

Another highlight was the Global Launch of the new Electronic Interactive IUPAC Periodic Table of the Elements and Isotopes by Peter Mahaffy.

The third was the presentation of the IUPAC Committee on Chemistry Education (CCE)'s Award for Distinguished Contribution to Chemistry Education to Kazuko Ogino of Tohoku University, Japan.

ICCE's technical program included a total of 141 presentations, comprising 6 Plenary Lectures, 13 Key-note Lectures, and 96 oral and 26 poster presentations. The 6 Plenary Lectures were as follows:

- Pursuit of My Dreams for Half-a-Century, by **Ei-ichi Negishi** (Nobel Laureate in Chemistry 2010, Purdue University, USA);
- Sustainability Through Attainability, by **Peter**

Atkins (CCE inaugural chair, Oxford University, UK);

- Faculty and Student Goals for Undergraduate Laboratory: The Conflicts Between Hands-on Skills, Critical Thinking and Efficacy, by **Marcy Towns** (Purdue University, USA);
- Models of Life Long Learning: Professional Development of Teachers, by **Rachel Mamlok-Naaman** (The Weizmann Institute of Science, Israel);
- Globalization of Chemistry Education: Comparison of K-12 Chemistry Standards across the World, by **Mei-Hung Chiu** (National Taiwan Normal University, Taiwan); and
- Motivation and the Undergraduate Chemistry Student, by **Robert (Bob) Bucat** (The University of Western Australia, Australia)

ICCE 2016 also included activities for teachers and students from Kuching and the surrounding areas. These were a IUPAC Young Ambassador for Chemistry (YAC) event for 40 teachers and 60 students; Microscale Laboratory Training for schools involving 20 teachers and 30 students; and Microscale Laboratory Training for 20 undergraduates and 20 lecturers at Universiti Malaysia Sarawak (UNIMAS).

Social & Cultural Events

Close to 200 delegates attended the ICCE 2016 Welcome Reception at Hilton Kuching on Monday, 15 August 2016. The delegates were treated to sumptuous local cuisines and pastries with a free flow of cordials and beer. There were lots of renewed acquaintances and networking among the delegates. This was truly a happy and joyous social occasion.



Cultural Dance Performance at Banquet

The ICCE 2016 Conference Banquet on Wednesday, 17 August 2016 was a grand occasion. 400 delegates, invited guests, and VIPs attended. The Chief

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Prof. Dr. Sim Kui Hian officiating the Opening Ceremony
From left, Peter Atkins, Marck Cesa, Ong Eng Long, Sim Kui Hian, Ei-ichi Negishi, Soon Ting Kueh, and Alvin Chai.

Minister of Sarawak was represented by YB Prof. Datuk Dr. Sim Kui Hian, the Minister of Local Government Sarawak. YB Prof. Datuk Dr. Sim gave a Welcome Address to invite all delegates to sample the delicious Malaysian food and local dishes. He also welcomed them to visit and tour various interesting places and tourist attractions in Sarawak.

At the Banquet, IKM Sarawak Branch also presented the 30th Anniversary Distinguished Service Award to Chan Woon Peng, the Founding Chair of the Branch, who has contributed tremendously to the development of the Branch and to chemistry in Sarawak.

Besides the wonderful foods, the delegates were entertained by a performance of Sarawak cultural dances by a group of dancers from Kumpulan Kesenian JKKN Sarawak. Kyoko Mori from Japan entertained with a performance on the flute, and then Ei-ichi Negishi serenaded the attendees with three songs accompanied by Miss Mori on the flute. The Chair of ICCE 2016 also entertained the guests with two songs, followed by two songs from the Taiwanese delegation, led by Mei-Hung Chiu. The Japanese delegation, led by Tamotsu Takahashi, followed with the song "Sukiyaki". Other performers included Puan Sri Law Hieng Ding nee Ngui Soon Leng, Lau Seng from UNIMAS, and the German delegation. Zuriati Zakaria from IKM also rendered a hot Tina Turner number, "What's Love Got To Do With It". It was a fun-filled evening of merry-making that the delegates truly enjoyed.

About 240 delegates participated in the ICCE 2016 Discovery and Cultural Tour on Friday, 19 August 2016. A first group visited the Semenggoh Wildlife Centre in the morning and the Sarawak Cultural Village in the afternoon. A second group visited the same sites in the reverse order.

It was really exciting that both groups witnessed



Mustafa Sozibilir presenting souvenir to CCE Past Chair, Prof. Mei-Hung Chiu at Closing of ICCE 2016

the feeding of the orang-utan. In the morning, the delegates managed to come face-to-face with six orang-utans, while the afternoon group saw three and had a close encounter with a male named Anuar. Then came the rain and many of us saw how Anuar used the large leaves to cover himself from the rain. They are almost human.

The tour of the Sarawak Cultural Village was equally entertaining. They saw the dwellings of seven local tribes of Sarawak and witnessed their ways of life and their cultures. There was a performance of cultural dances from the various tribes.

Appreciation

On behalf of the Organisers, IKM would like to extend our sincere appreciation to the Chief Minister of Sarawak, YAB Datuk Patinggi Tan Sri (Dr.) Haji Adenan Bin Haji Satem, for officiating the Opening Ceremony of ICCE 2016 and for the strong support of the Sarawak Government. We would also like to thank the Sarawak Convention Bureau and the Malaysia Convention and Exhibition Bureau for their support in the bidding and management of ICCE 2016. To the other major sponsors, including Tan Sri Law Hieng Ding Foundation, Lee Foundation, Chemsain Konsultant Sdn Bhd, KISM Sdn Bhd, and Foundation for the Interaction of Science and Technology Japan, we would like to convey our utmost sincere gratitude and appreciation for their strong support.

As Chair of the National Organising Committee (NOC) of ICCE & ISPAC 2016, I am personally indebted to the members of NOC who have worked so hard to put everything together to make a successful ICCE & ISPAC 2016. To members of the International Advisory Committee and the National Advisory Board, we are really grateful for advice and technical input.

The success of ICCE & ISPAC 2016 is largely due to the delegates, including the Session Chairpersons,

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the Plenary Speakers, oral and poster presenters, and the other participants. Last but not least, I am very much indebted to ICCE & ISPAC 2016 Secretariat staff, headed by Ms. Ong Bee Kwan, Dr. Alvin Chai Lian Kuet and members of the IKM Sarawak Branch Committee, and Associate Prof Dr. Sim Siong Fong and her UNIMAS team.

The 25th ICCE will be organized in Australia in 2018 by The University of Sydney and chaired by Dr. Sigi Schmith. See you there!

<http://www.icce2016.org.my>

Green Chemistry

by Pietro Tundo

After Dresden, Moscow, Ottawa, Foz do Iguaçu, and Durban, the **International IUPAC Conference on Green Chemistry** (ICGC) moved to Italy. ICGC-6 took place 4-8 September 2016 in Venezia, one of the most beautiful cities in the world, filled with history and culture, which welcomes more than 20 million visitors from all over the world each year. The Centro Culturale Candiani and the Teatro Toniolo of Venezia Mestre hosted the five-day scientific event. The conference belongs to a series developed by the IUPAC Subcommittee on Green Chemistry (a subcommittee of the Organic and Biomolecular Chemistry). Pietro Tundo, chair of the subcommittee, managed the event organization, together with the Organizing Committee, composed of Fabio Aricó, Lucio Ronchin, and Andrea Vavasori from Ca' Foscari University of Venice, and the Secretary of the Conference, Emilia G. Pasta.

The Conference was organized in collaboration with the Consiglio Nazionale dei Chimici and obtained the endorsement of UNESCO, Italian National Commission for UNESCO, Italian National Committee for IUPAC, ICSU, CNR, Società Chimica Italiana, AIRI, IUAV, Royal Society of Chemistry, Ordine dei Chimici di Venezia, Città Metropolitana di Venezia, Città di Venezia, and 7 Italian Ministries: Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Ministero dello Sviluppo Economico, Ministero della Giustizia, Ministero dei Beni e delle Attività Culturali e del Turismo, Ministero dell'Istruzione, dell'Università e della Ricerca, Ministero della Salute, and Ministero degli Affari Esteri e della Cooperazione Internazionale. It was supported by Ca' Foscari University of Venice and Regione del Veneto and was sponsored by: PhosAgro, the Organisation for the Prohibition of Chemical Weapons (OPCW); Milestone as platinum sponsor;

Mapei, Cefic, L'Oréal and Ecopneus as gold sponsors; Nemo Glass and Perkin Elmer as silver sponsors; and Biogest and Pirelli as bronze sponsors.

The conference was divided into five topics: Green Materials, Green Industrial Processes and Molecular Innovation, Green Bioprocesses, Green Energy, and Green Policy and Education.

ICGC-6 kicked off on Monday, 4 September, at the Teatro Toniolo of Venezia Mestre with Tundo's welcome message. Then, the following personalities took the floor: Michele Bugliesi, Rector of the University of Venice; Paolo Pellegrini, City of Venice; Romain Murenzi, UNESCO Director for Science Policy and Capacity Building; Andrei Guriev, CEO of PhosAgro; David Black, Secretary General of International Council for Science (ICSU); Xiaohui Wu, Head of the OPCW International Cooperation Branch; Nausicaa Orlandi, President of the Consiglio Nazionale dei Chimici; Mauro Marchetti, Consiglio Nazionale delle Ricerche; and Carlos Tollinche, CHEMRAWN Chair, IUPAC.



Presentation of the IUPAC-CHEMRAWN VII Award: from left, IUPAC President Natalia Tarasova, Award recipient Ali Makeji, CHEMRAWN Chair Carlos Tollinche, and ICGC-6 Chair Pietro Tundo.

After these contributions, two awards were presented: CHEMRAWN Award for Green and Atmospheric Chemistry and the PhosAgro/UNESCO/IUPAC awards. The 2016 IUPAC-CHEMRAWN VII award for Green Chemistry was presented to Ali Maleki from the Iran University of Science and Technology. Next, J. Corish (University of Dublin, Ireland) presented the six awards of the 3rd edition of the PhosAgro/UNESCO/IUPAC "Green Chemistry for Life" to: A. Akhmetshina (Russia), I. Carrera (Uruguay), M. Ismail (Pakistan), E. Ravera (Italy), A. S. Elsayed Sayed (Egypt) and W.C. Wanyonyi (Kenya).

ICGC-6 success is in the numbers: 580 registrations from 76 countries, 400 active participants from more than 60 different countries, 4 daily parallel ses-