



# *International Union of Pure and Applied Chemistry*

A member of the International Council of Scientific Unions

## **Division of Chemistry and the Environment (DCE - VI)**

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### **Report of Activities**

**August 2005 – September 2006**

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#### **0. TERMS OF REFERENCE**

Through its internationally recognized membership and project teams, the Division of Chemistry and the Environment (DCE) will provide unbiased and timely authoritative reviews on the behavior of chemical compounds in food and the environment. The DCE will undertake both fundamental and applied evaluations that contribute to solving environmental problems and enhancing the quality of food on a global scale.

#### **1. PEOPLE AND ORGANIZATION**

The Division Committee (DC) is currently comprised of 10 TM's, 7 AM's, and 7 NR's. The 7<sup>th</sup> AM is a position added during 2004 to foster a closer working relationship with IOCD. A new Division Secretary, Willie Peijnenberg, assumed responsibilities during 2006. After serving also during the 2004-2005 biennium, Division President Kenneth Racke continued his term for the 2006-2007 biennium. The Division does not currently have a Vice President.

The membership (24) of the DC for the current biennium includes representatives of 20 countries, with each region of the globe well represented with the exception of Latin America. The DC includes 5 women and 2 representatives from scientifically emerging countries (China, Pakistan).

The work of the Division Committee is assisted by the efforts of several sub-committees (SC), which identify new priority project areas, stimulate proposals and recruit project leaders, and facilitate external communications:

- Biophysico-Chemical Processes in Environmental Systems
- Chemistry of Environmental Compartments
- Crop Protection Chemistry
- Food Chemistry

The Chairman appointed to each SC is a member of the DC, and this allows a high level of coordination to be maintained. Membership of the SC's brings additional experts into the work of IUPAC, including representatives from Latin America. The communication of IUPAC activities and project outcomes is enhanced through the activities of these SC.

A Nomination Committee has recently been formed under the Direction of DC TM Laura McConnell to supervise the DC elections to be held during early 2007. At least one strong candidate for future DP has emerged from the existing DC membership.

#### **2. EXISTING PROJECTS**

Projects sponsored by the DCE generally fall into three broad categories. First, state-of-the-art authoritative reviews of a particular area of environmental chemistry are developed and published in book form. To this end, the Division has a long-standing working partnership with Wiley Press. Second, technical evaluations focus on critical assessment and development of specific recommendations for an area of environmental chemistry so as to assist

and influence research and public policy. Primary areas of emphasis include definitions, methodologies, and regulations. Third, outreach activities help move IUPAC project outcomes outside the small circle of specialists and into the broader scientific and regulatory arena, with a strong emphasis on technology transfer to developing countries. These outreach activities include both regional workshops and international congresses that maintain a high level of IUPAC involvement and serve to highlight ongoing and completed IUPAC projects.

At the beginning of the 2006-2007 biennium there were 22 active projects, including 4 that were interdivisionally sponsored (Appendix I). Of these 22 projects, 2 have been completed with final reports in-press at PAC, 1 moribund project has been abandoned, and 5 projects are nearing completion and submission for publication is anticipated by the end of 2006. Most of the remaining projects are demonstrating good progress. The Division finds that in several cases project completion has been delayed beyond original targets. This appears due to a number of factors including overly optimistic estimates of project completion, ambitious project objectives, slow delivery on promised contributions from diverse and widely scattered task group members, and strong scientific but poor administrative leadership by task group leaders.

A summary of recent and pending technical reports and other reports of the Division may be found in Appendix II.

### **3. NEW PROJECTS AND PENDING PROPOSALS**

Since the first of the year, 9 new project proposals have been approved or are in review (Appendix III). Of these, 5 new projects have been approved and funded including 3 interdivisional efforts. Decisions on the remaining 4 proposals are anticipated during the next 2-3 months.

Based on the existing projects still in progress and the 5 newly approved projects, the Division has a total of 24 active projects as of September 2006.

### **4. CONFERENCES**

There are two major IUPAC conference series that the Division has organized to advance particular areas of chemistry, raise interest in and awareness of the Union, help disseminate and publicize IUPAC project outcomes, and solicit project ideas and recruit task group members. Several other topics are emerging as potential future conference series.

The **IUPAC International Congress of Pesticide Chemistry** has been hosted for more than 40 years. The 11<sup>th</sup> IUPAC International Congress of Pesticide Chemistry was held during August 2006 in Kobe, Japan, and it was co-organized with the Pesticide Science Society of Japan (PSSJ). More than 1100 chemists from 52 countries participated in the Congress, which was organized around the theme "Evolution for Crop Protection, Public Health, and Environmental Safety". The core of the scientific program consisted of welcoming speeches on behalf of PSSJ and IUPAC, 5 keynote addresses, more than 100 invited lectures, and nearly 600 posters. The Congress included an outreach program to consumer groups and the media which drew nearly 400 additional, non-chemist participants. Two strong bids for future Congress locations were received, and the Division recently agreed to organize the 12th IUPAC International Congress of Pesticide Chemistry for July 2010 in Melbourne, Australia in cooperation with the Royal Australian Chemical Institute.

The **IUPAC International Symposium on Mycotoxins and Phycotoxins** has been hosted for more than 30 years. The XI IUPAC International Symposium on Mycotoxins and Phycotoxins, was held in Maryland, USA, during May 2004. Over 300 participants from 41 countries were present for 63 oral presentations and 127 posters. This symposium was only the latest in a long-standing series that has become the premiere forum for exchange of research results and methodologies related to these important naturally occurring toxins. The traditional strength of IUPAC as related to the chemistry aspects of these biotoxins has been an important factor in the success of this series. The XII IUPAC International Symposium on Mycotoxins and Phycotoxins will be held in Istanbul, Turkey during May 2007.

The 6<sup>th</sup> **IUPAC International Workshop on Crop Protection Chemistry** was held in San Jose, Costa Rica during February 2005. Around 250 participants from 28 countries participated in this workshop. This series was initiated

during 1988 and is focused on bringing together scientists from a particular region with key international experts around the topic of harmonized approaches to evaluation and regulation of crop protection chemistry. The 7<sup>th</sup> workshop is being planned for October 2007 in Beijing, China.

The first **IUPAC International Workshop on Fats, Oils and Oilseeds Analysis and Production** was held in Brazil during 2000. The second workshop, in what hopefully will become a standing series, was held in Tunis, Tunisia during December 2004, and was targeted at the important vegetable oil-exporting region of North Africa.

## 5. BUDGET

During the 2004-2005 biennium, Division VI allocated 76.5% (\$52,000) across 13 projects and spent 23.7% (\$16,123) of its budget on operations. Most of the operations budget was used to bring AM's and NR's to the annual DC review meeting. The Division allocated 100.2% of its funds during the biennium, and also elicited funding support from the IUPAC Project Committee and outside organizations for several of its projects.

During the 2006-2007 biennium the Division has targeted to spend 70% of its budget on project activities. Of the initial allocation of \$68,000, project allocations so far total \$9,750 (14.3%) and operations expenses of \$18,406 (27.1%) have been experienced. The primary operational expense was support of AM's and NR's attendance at the annual DC review meeting.

## 6. FUTURE ISSUES AND OPPORTUNITIES

Several priority areas of future activity for the Division are noted below:

- Timely completion of ongoing projects – A total of 24 active projects are now supported by the Division. Regular progress reports allow the Division to monitor progress. Decisions to accelerate (e.g., top-up funding) or abandon several of the older, slower-moving projects will be needed in future.
- Continued generation of project proposals – A number of new proposals have already been received for consideration during the biennium, and it is important that the flow of high quality proposals continues. Although conference proposals come from many quarters, project proposals primarily originate from those with some familiarity with IUPAC.
- Ramp-up of food chemistry activities – Following an idea-generating workshop at the Beijing GA, food chemistry activities are slowly increasing following a lull of several years. Two active projects on food chemistry are now supported and a third proposal is anticipated in near future.
- Selection of new members and leadership – A large amount of DC energy goes into the biennial election process, and the newly appointed Nominating Committee is active and has at least one good candidate for Division President. The 2-year terms of AM and NR seem too abbreviated to allow significant contributions.

## APPENDIX I. EXISTING PROJECTS (active as of 1 January 2006)

- 630/24/95 - Solute movement in soils with potential rapid by-pass transport (completed and in-press at PAC)
- 1999-041-1-600 - Bioavailability of xenobiotics in the soil environment (nearing completion)
- 1999-014-2-600 – Airborne and remote monitoring of water quality: evaluation of remote sensing techniques for water quality control in surface water bodies (abandoned based on lack of progress)
- 2001-022-1-600 - Global availability of information on agrochemicals
- 2001-023-1-600 - Agrochemical spray drift: Assessment and mitigation (nearing completion)
- 2001-024-2-600 - Impact of transgenic crops on the use of agrochemicals and the environment (nearing completion)
- 2001-026-1-600 - Use of reference soils for testing fate and effects of chemicals
- 2001-039-1-600 - Pest management for small-acreage crops: a cooperative global approach (nearing completion)
- 2002-013-2-600 - Determination of trace elements in oils and fats by inductively coupled plasma optical emission spectroscopy - evaluation of a method by collaborative study (nearing completion)
- 2003-011-3-600 - A critical compendium of pesticide physical chemistry data\*
- 2003-013-1-600 - Crop protection chemistry in Latin America: Harmonized approaches for environmental assessment and regulation
- 2003-014-2-600 - Fractal structures and processes in the environment
- 2003-017-2-600 - Remediation technologies for the removal of arsenic from water and wastewater
- 2003-030-1-600 - Glossary of atmospheric chemistry
- 2003-058-1-600 - Air pollution models in environmental management and assessment
- 2004-002-1-600 - Glossary of terms related to pesticides (completed and in-press at PAC)
- 2004-003-3-600 - Biophysico-chemical processes of heavy metals and metalloids in soil environments
- 2004-005-2-500 - Comparable pH measurements by metrological traceability\*
- 2004-011-1-600 - Development of simplified methods and tools for ecological risk assessment of pesticides
- 2004-015-1-600 - Environmental colloids: behavior, structure and characterization
- 2004-017-1-500 - Standardization of analytical approaches and analytical capacity-building in Africa\*
- 2004-022-3-400 - Terminology and measurement techniques of starch components\*

\* Interdivisional project

## APPENDIX II. RECENT AND PENDING PUBLICATIONS

### *Technical Reports and Recommendations*

Kördel, W.; Egli, H.; Klein, M.; "Transport of pesticides via macropores." *Pure Appl. Chem.* (2006), *in press*.

Stephenson, G.R.; Ferris, I.G.; Holland, P.T.; Nordberg, M. "Glossary of terms relating to pesticides." *Pure Appl. Chem.* (2006), *in press*.

### *Other Reports*

Cantrill, R.; Dyssele, P. "Report on the IUPAC-AOCS workshop on fats, oils, and oilseeds analysis and production." *Chem. Int.* (2005) 27: 32-33.

Kördel, W.; Klein, M. "Prediction of leaching and groundwater contamination by pesticides." *Pure Appl. Chem.* (2006) 78:1081-1090.

Loffredo, E.; Senesi, N. "Fate of anthropogenic organic pollutants in soils with emphasis on adsorption/desorption processes of endocrine disruptor compounds." *Pure. Appl. Chem.* (2006), 78: 947-961.

Park, D.L. "11<sup>th</sup> IUPAC International Symposium on Mycotoxins and Phycotoxins." *Chem. Int.* (2005), 27:36-27.

Racke, K.D.; Carazo, E.; Roberts, G. "Advancement of harmonized approaches for crop protection chemistry in Latin America." *Chem. Int.* (2005) 27: 4-7, 24-25.

Stephenson, G.; Solomon, K.; Carazo, E. *Pesticides in the Environment*. University of Costa Rica Press, San Jose (2006) *in press*.

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## APPENDIX III: NEW AND PENDING PROJECTS (since 1 January 2006)

2005-024-2-600 - Establishment of guidelines for the validation of qualitative and semi-quantitative (screening) methods by collaborative trial: a harmonized protocol\*

2005-042-1-300 - Chemistry for Biology - an inventory for interdivisional and interdisciplinary activities within IUPAC in the field of biological chemistry\*

2005-048-2-100 - Solubility and thermodynamic properties related to environmental issues\*

2006-011-1-600 - Critical review of available methods to predict VOC emission potentials for pesticide formulations

2006-014-1-600 - Biophysico-chemical processes involving natural nonliving organic matter in env. systems

2006-015-1-600 - *Implications of altered residues of pesticides applied on transgenic crops for food safety\**

2006-017-1-600 - *Crop protection chemistry in Asia: harmonized approaches for safety evaluation, regulation, and protection of trade*

2006-037-1 - *Metal-focussed –omics: guidelines for terminology and critical evaluation of analytical approaches\**

2006-039-1 - *Extraction and fractionation methods for risk assessment related to trace metals, metalloids and hazardous organic compounds in terrestrial environments\**

\* Interdivisional project or potential interdivisional project