Item 10: Division of Chemistry and the Environment

IUPAC
Division VI Division of Chemistry and the Environment (DCE)

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I. EXECUTIVE SUMMARY

Projects

The broad mandate of the Division requires addressing global and regional issues of chemicals in the environment. The major part is customer oriented with industry, international environmental protection organisations and agencies being major customers, but also communicating actual issues by extension workshops and conferences to scientists, especially in developing countries, is an important task.

The strategy within DCE Commissions in developing new projects has been to take up current issues in their area of competence, where appropriate in cooperation with other organisations, develop projects rapidly and have customers involved in planning and as project members. Thus, dissemination of the Division's projects is not only through publications, workshops and other scientific meetings. Some of the most successful projects have been those where the customers were involved at early stages through direct representation as Commission Members.

Consequently, the DCE strategy for new project areas is to further enhance customer orientation by consistently involving the parties interested in the work already in the project development and by reacting proactively to issues raised within the mandate of the Division. This will ensure optimal use of the work of our experts, gives them status and motivation. It would be helpful if a membership category on the Division Committee could be established for the recipients of the work, e.g. industry and agencies representatives. This category should be higher level than observer.

Cooperation with other International Organisations

There is successful cooperation on a project basis (state of the art and workshop) and through eminent commission members with scientific organisations and customers. These include IOCD, WHO, Codex Alimentarius (FAO/WHO), the EU Commission, to give only a few prominent examples. In addition, there is a long-standing cooperation with ICSU/SCOPE due to the partial overlap of interests. Activities have been initiated to increase this type of cooperation with OECD, IFCS and with industry via ICCA. An extraordinary large project initiated by DCE is

Environmental Implications of Endocrine Disrupting Chemicals. This is a joint IUPAC/SCOPE project, sponsored and co-financed additionally by industry and several further national and international organisations. Cooperation with OECD is at present mainly within the Green Chemistry area. However, the successful case-by-case interactions will be expanded and intensified as needed on a project basis.

Interdivisional Cooperation

There is still insufficient interdivisional cooperation. One major project/project area to be mentioned is Green Chemistry, led by Division III, in which DCE has been involved and is planning to make substantial contributions. The difficulties in expanding inter-divisional work largely relate to cumbersome communication procedures and the lack of resources and personal commitment necessary for large multi-disciplinary projects.

II. ACHIEVEMENTS

The Commissions of the Division have been working on a set of scientifically interesting and applied projects, which include state of the art elaborations for publication as well as extension workshops.

Fundamental Environmental Chemistry

In the fundamental area for the advancement of science, projects are continuing as a book series (Wiley). Major ongoing topics are the biogeochemistry of ion in situ analytical techniques for water and sediment, biophysical chemistry of environmental systems, and interactions between environmental particles and microorganisms.

Projects for Industry and Society

The Commission on Atmospheric Chemistry has worked on specific projects developed by Commission Members, and reflecting ongoing advances in the area, e.g. 'The deposition of inorganic and organic compounds on different scales of space and time'. The Commission on Soil & Water Chemistry has recently taken up a number of new questions on soil chemistry, which are in the context of ongoing soil legislation or regulations, e.g. 'The control of remediated soil'. The Commission on Agrochemicals & the Environment with substantial industry membership has conceptual as well as specific projects, e.g. 'The disposal and degradation of pesticide waste' in the context of pesticide registration and related to activities in international plant protection organisations. The work of the Commission of Food has still been separated into the former Commissions activities, namely contaminants (e.g. mycotoxins) and their analysis in food commodities and analytical methods for contaminants in oils and fats. The results of the work of both groups are directly used by food industry, advisory bodies and agencies, which act partly also as co-sponsors. An example of this work is the 'Replacement of toxic chemicals in IUPAC standard methods' for oils, fats and derivatives in cooperation with AOCS, AOAC, FOSFA International and ISO.

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In 1999-2000 there were 14 projects completed or terminated and 16 new projects were approved. Many of the new projects are intra-divisional showing an increasing interaction between several Commissions. Two major projects are inter-divisional.

Extension Workshops

The Commissions have initiated and organised regularly extension workshops, preferably in developing countries, aiming at an up-to-date training of scientists in the region on actual topics relevant to regional needs and aligned to the Commission's work. These workshops have been mostly organised in collaboration with other international scientific organisations or other relevant partners, including customers of the products such as industry. In the present biennium there are six such workshops, being held in developing /transitional countries including S. Africa, Brazil, China, Hungary, Israel, Poland, Taiwan.

The success of these extension activities can only be ensured by IUPAC providing some funding with partner organisations supplying matching funds. These workshops develop substantial exposure and credit to IUPAC, particularly in developing and transitional countries. Considering the importance of this type of activity within the strategic plan of IUPAC, a procedure has to be found to assure their continuation.

III. STRATEGY

Within its mandate, the Division will need to expand its activities to encompass all the areas of chemistry involved in the protection of the environment and the consumer. This expansion must be continuously reviewed for its relevance and priorities developed for projects with high 'customer' interest and which ensure attraction of the most competent participants.

Consequently, a revision of the terms of reference is under discussion, the draft reading: "Through its internationally recognised membership, the DCE will provide authoritative, unbiased and timely critical reviews on the chemistry of food and the behaviour of chemicals in the environment. The DCE undertakes both fundamental and applied studies aimed at problems in food and environmental chemistry. In this way DCE contributes to global sustainable development."

It is anticipated, that the competence within the Division needs to be developed under three dimensions:

- Compartments (which are the main basis for many DCE Commission structures) including air, water, soil, food, constructions and waste.
- Processes, protection objectives and methodology including chemical safety, chemical hazards, environmental fate, environmental analytical chemistry, modelling environmental processes. Comprehensive risk assessment is also a very important topic that should be included, however collaboration with Division VII, will be needed to deal authoritatively with human risk assessment.
- Chemical groupings including bulk and fine chemicals, agrochemicals (of continuing high relevance), pharmaceuticals and veterinary drugs (to become an issue), natural toxicants (to

expand from mycotoxins), biochemicals and the chemical safety of genetically modified organisms (environment and food).

Within this list there are only very few items in which DCE Commissions have not been active so far. This broad concept is to be kept in order to be attractive for a wide range of customers and to react with high flexibility to deal with emerging issues in a timely fashion.

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IV. LIST OF PUBLICATIONS (1999 – 2001)

- Trace Elements in Food.
  Conference report, Chem. Int. 23(3), 2001

- Foliar Interception and Retention Values after Pesticide Application. A Proposal for Standardized Values for Environmental Risk Assessment (Technical Report) (VI.4)
  Pure Appl. Chem., 72(11), pp. 2199-2218, 2000

- Mechanism of Fe(OH)2+ (aq)photolysis in aqueous solution (Technical Report) (VI.2)
  Pure Appl. Chem., 72(11), pp. 2187-2197, 2000

- Guidelines for terms related to chemical speciation and fractionation of trace elements. Definitions, structural aspects, and methodological approaches (IUPAC Recommendations 2000) (V.2, VI.1, VII.C.2)
  Pure Appl. Chem., 72(8), pp. 1453-1470, 2000

- Beryllium in food and drinking water - a summary of available knowledge (VI.5)
  Food Additives and Contaminants, 2000, 17(2), 149-159

- Mycotoxins and Phytotoxins. Conference report
  Chem. Int. 22(5), 2000, Proceedings published by Ponsen & Looijen, Wageningen, Netherland, W. DeKoe, ed. , 2000

- The use of diffusive sampling for monitoring of benzene, toluene and xylene in ambient air (VI.2)
  Pure Appl. Chem., 71(10), pp. 1993-2008, 1999

- Determination of mono- and diacylglycerols in edible oils and fats by high performance liquid chromatography and evaporative light scattering detector: Results of collaborative studies and the standardised method (VI.6)
  Pure Appl. Chem., 71(10), pp. 1983-1991, 1999

- Reports on pesticides (41). Significance of the long range transport of pesticides in the atmosphere (VI.4)
  Pure Appl. Chem., 71(7), pp. 1359-1383, 1999

- IUPAC collaborative trial study of a method to detect genetically modified soy beans and maize in dried powder (VI.5)
  JAOAC International, 1999, 82(4), 923-928

- The determination of cadmium in oils and fats by direct graphite furnace atomic absorption spectrometry (VI.6)
  Pure Appl. Chem., 71(2), pp. 361-368, 1999

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- The determination of stigmastadienes in vegetable oils (VI.6)
  Pure Appl. Chem., 71(2), pp. 349-359, 1999

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IV. LIST OF EXTENSI0N WORKSHOPS AND CONFERENCES (1999-2002)

- „International Workshop on Principles and Practices of Method Validation", 1999, Budapest, Hungary.
- Atmospheric Deposition and its Impact on Ecosystems with Reference to Mid-East Region, 2000, Tel-Aviv, Israel.
- IUPAC/TACTRI Workshop on "Harmonization of Pesticide Management: Regulation, Monitoring and Evaluation" 2000, Taichung Hsien, Taiwan.
- Local and Regional Contribution to Air Pollution in Asian Developing Countries
- Fats, Oils and Oilseeds Analysis.
- Trace Elements in Food, 2000, Warsaw, Poland.
- 10th International IUPAC Symposium on Mycotoxins and Phycotoxins, 2000, Sao Paolo, Brazil.
- 10th IUPAC International Congress on the Chemistry of Crop Protection (formerly International Congress of Pesticide Chemistry), 2002, Basel, Switzerland.
- Environmental implications of endocrine active substances: Present state-of-the-art and future research needs, 2002, Yokohama, Japan.