



**INTERNATIONAL COOPERATION ON
INNOVATIVE AND SUSTAINABLE
UTILIZATION OF
*MOLECULAR BIODIVERSITY***

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INTRODUCTION

Biodiversity is essentially *chemical* in origin. The unique and diverse molecular libraries provided by planetary flora, fauna and micro-organisms have been a source of immense practical value to mankind. Chemical biodiversity serves as a treasure house of as yet **unidentified molecular structures**, whose potential significance cannot be conceived at the present time.

The necessity for mutually advantageous **global cooperation** in the **utilization of bioresources** is obvious. An essential element of such cooperation is the equitable benefit sharing between partners. Enhancement of the value of a chemical resource can help to support its conservation by making its sustainable use more relevant to society. Since information at the molecular level is critical to higher-scale development, the chemical community is involved in the discussion of scientific, economic and ethical issues that are associated with international cooperation. To this end, the International Union of Pure and Applied Chemistry (IUPAC), the only independent global association of chemists, has a responsibility **to develop suitable recommendations** for this cooperation.

GOAL

TO DEVELOP INTERNATIONALLY ACCEPTABLE
RECOMMENDATIONS FOR ACADEMIC AND INDUSTRIAL
COOPERATION ON *MOLECULAR BIODIVERSITY*

STRATEGY

- TO FORMULATE RECOMMENDATIONS BASED ON DISCUSSIONS
- IN WORKSHOPS - HELD IN SELECTED COUNTRIES
- INVOLVING NATIONAL AND INTERNATIONAL REPRESENTATIVES OF RELEVANT ORGANIZATIONS

PARTICIPATING GROUPS

- IUPAC ORGANIC AND BIOMOLECULAR CHEMISTRY
Division (Div. III)
- IUPAC CHEMISTRY and HUMAN HEALTH
Division (Div. VII)
- IUPAC COMMITTEE ON CHEMISTRY and INDUSTRY
(COCI)

Funding and organization

- Milestone 2. IUPAC Div. III, Univ. of Amsterdam, individual participants
- Milestone 3. UNESCO, Jakarta Office, ICSU, IUPAC, Thai National Commission for UNESCO, National Center for Genetic Engineering and Technology, National Science and Technology Development Agency, Ministry of Science Technology and Environment, Chemical Society of Thailand
- Milestone 4. CAST, IUPAC Biodiversity Project, individual participants

Milestone 1. PHUKET DECLARATION

The Phuket declaration concerning the *Conservation and Sustainable Utilization of Biological Diversity* was adopted at the 1st IUPAC International Conference on Biodiversity.

November 23 - 27, 1997, Phuket Thailand.

Chem. Int., 1998, Vol 20, p. 139; *Pure Appl. Chem.*, 1998, Vol. 70, No. 11, p. v.

Milestone 2. AMSTERDAM MEETING

- 26 March 1999, University of Amsterdam
PARTICIPANTS: Project Coordinators, Representatives of Divisions III, VII and COCI, Guests from Germany and Turkey [total 9]
- *Activities and Conclusions*: The existing status of international cooperation in the area of molecular biodiversity was reviewed. In the light of regulations being enacted by various countries, it was projected that IUPAC should undertake **the development of recommendations for international cooperation**, in which especially chemists had a significant stake.

Milestone 3. WORKSHOP THAILAND

- 26 -28 November 1999, Bangkok
PARTICIPANTS: 37 participants from 14 different countries, including representatives of UNESCO, The World Conservation Union [IUCN] and the major biodiversity rich countries in South East Asia.
- *Activities and Conclusions:* The workshop was opened by the Minister of Science, Technology and Environment, Thailand. The program incorporated presentations by representatives of UNESCO, The World Conservation Union, International Industry, Academia, Governmental and Non-governmental organizations. Recommendations were formulated.
Chem. Int., 2000, Vol. 22, No. 3, p.74
- Considering the special position of China with regard to Biodiversity, the need for a follow-up workshop in China was recognized. It was planned that the recommendations could be reviewed with the Chinese input before finalization for presentation to IUPAC/ICSU.

Milestone 4. WORKSHOP CHINA

- 6-11 April 2001, Kunming
PARTICIPANTS: 9 IUPAC members of the Biodiversity Project, Representatives of Academia, Ministry of Science, Chinese Association of Science and Technology [CAST], Chinese Chemical Society, Government Research Institutes [15]
- *Activities and Conclusions:* The initial recommendations were modified in the light of discussions.

Milestone 5. FINAL TEXT PREPARATION

- The provisional recommendations will be discussed at the IUPAC General Assembly, in Brisbane (July 2001). After their approval by IUPAC (by December 2001), the final version will be published in *Chem. Int. and Pure Appl. Chem.* and submitted to ICSU for publication in its journal, *Science International*.

PROVISIONAL RECOMMENDATIONS

Preamble - Pre-agreed common policy guidelines

- **Dedicated** to the conservation of biomolecular resources for future generations
- **Recognizing** the vital role of science worldwide in education, research and innovation
- **Recognizing** the important ecological roles played by local and regional biodiversity
- **Recognizing** the contributions which the molecular diversity of natural products from the biome have made to the health and welfare of humankind
- **Recognizing** the need of avoidance of environmental pollution and ecological destruction arising from over-exploitation of biological resources
- **Affirming** their commitment to cooperate fairly and equitably with stakeholders for the benefit of humankind and the sustainable use of diversity at both the molecular and organism level
- **Recognizing** the sovereign rights of states over their own natural resources and the authority of national governments to determine access to biological and genetic resources, subject to national legislation
- **Acknowledging** the interests of other stakeholders from the country or from abroad, including indigenous and local communities and farmers, in natural resources and existing knowledge
- **Determined** to honour the spirit of international, regional, national and sub-national laws and policies concerning biological and molecular diversity as well as intellectual property rights
- **Committed** to ensure fair and equitable sharing of benefits arising from the sustainable utilization of natural resources
- **Dedicated** to the fostering of research, and the accumulation and dissemination of all knowledge, especially at the molecular level
- **Dedicated** to the enhancement of the scientific and technological expertise and resources of developing countries

PROVISIONAL RECOMMENDATIONS *(cont.)*

It is agreed as follows

Authorization

- All material exchange, cooperative early steps in innovation and commercial cooperation must be conducted under the auspices of relevant authorities.
- All countries should facilitate the rapid and efficient formulation of contracts between interacting partners.

Interests

- Academic interaction is directed at generating fundamental scientific knowledge in the first instance. It has to be recognized that such basic knowledge can become the subject of translation into products and services with the potential to bring about economic benefits.
- There is a genuine interest of all partners in the translation of scientific knowledge into commercially viable products and services and in the fair sharing of ensuing benefits.
- All of the cooperating partners are interested in fast and simple mechanisms regulating the common activities, and in avoiding a slow and complex process.
- The bioaffluent countries are interested in enhancing their technical training, in improving their facilities as well as in safeguarding sustainable management of their natural resources and harnessing biodiversity for economic development.
- Partners from high technology regions are motivated by the search for novel molecular structures and the underlying biomolecular chemistry made available by the partnership.
- All partners should appreciate each others genuine interests and work in a spirit of mutual understanding, common accountability and trust.

(cont.)

Contributions

- Authorities in bioaffluent countries should invest in infrastructure and mechanisms for innovation facilitating the emergence of small and medium-sized R and D enterprises (SMEs), as they constitute the main business partners for globally active companies.
- Bioaffluent countries should offer the biota within their jurisdiction for scientific investigation. They also contribute traditional information on empirical correlations between biocomponents and their potentially exploitable functions.
- High technology partners should provide modern technical expertise for the isolation, identification, evaluation and eventual generation of molecular libraries of biocomponents judged to be of value. In many cases they contribute their share of financial commitment as well, from both private and public sources.
- High technology partners should provide for transfer of appropriate technology to parties in bioaffluent countries.
- Bioaffluent countries should contribute technical manpower and field labor to the project.
- All cooperating parties should contribute appropriately to the financial investments supporting the project.

Obligations

- The terms of any contract constitute the basis of the formal obligations for all parties.
- The partners should insure free flow of scientific information where possible. They should collaborate in any publication of scientific results, after due protection of economic interests of any partner and guided by the clauses of eventual patent laws.

Benefit Sharing

- Partners should share fairly and equitably the benefits arising from the utilization of bioresources.