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## Central and Eastern European POPs Centre

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Based on the experience related to activities of the European POPs Expert Network and to long-term activities in the field of persistent organic pollutants, the Masaryk University Brno and the Ministry of Environment of the Czech Republic established

### **Central and Eastern European Regional Centre for Persistent Organic Pollutants (CEEPOPsCTR)**

in September 2005 as their joint contribution linked to the implementation of the Stockholm Convention (SC) in the countries of Central and Eastern Europe (CEE).

Centre is located in the new campus of Masaryk University in Brno, Czech Republic.

CEEPOPsCTR activities are coordinated and supported by the RECETOX (Research Centre for Environmental Chemistry and Ecotoxicology, the EU Centre of Excellence for Environmental Chemistry and Ecotoxicology) of the Masaryk University Brno and by the Ministry of the Environment of the Czech Republic.

CEEPOPsCTR associates country representatives, institutions and experts from CEE countries as well as interested parties outside of the CEE UN region.

CEEPOPsCTR acts as a scientific and technical platform for the EU, CEE region and for some of newly independent states (NIS) of the former Soviet Union to bridge and harmonize their national POPs activities at the regional level. The CEEPOPsCTR promotes joint initiatives focused on POPs involving UN Agencies and UN Institutions operating in the field of the environmental protection. Possible future partnerships with UNEP Chemicals, UNIDO-CPC, ICS-UNIDO and other UN bodies, as well as with the European Union and regional institutions are to be discussed in near future.

### **OBJECTIVE**

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in May 2001. Its main objective is protecting human health and environment from persistent organic pollutants.

The principal interest of CEEPOPsCTR is to bring together scientists, researchers and institutions especially from the CEE UN region to enhance overall potential for joint research focused on POPs and for problem solving connected with the POPs environmental contamination of Central and Eastern European countries.

The CEEPOPsCTR is meant to provide a platform for scientists working in the field of environmental chemistry, environmental toxicology, ecotoxicology, risk analysis, degradation and biodegradation, disposal and remediation taking into account the circumstances and particular requirements of developing countries, in particular the least developed among them and countries with economies in transition, especially the need to strengthen their national capabilities for chemicals management, including through the transfer of technology, the provision of financial and technical assistance and the promotion of cooperation among the Parties.

CEEPOPsCTR is ready to serve as a scientific and training base for the implementation of the Stockholm Convention and related international multilateral conventions for the Central and Eastern European region as well as other regions interested in cooperation.

## BACKGROUND

**RECETOX** (Research Centre for Environmental Chemistry and Eco**TOX**icology) was established in 1994 with the support of PHARE Programme as a research unit of the Department of Environmental Chemistry and Ecotoxicology.



The **RECETOX** was selected as **EU-DG Research Centre of Excellence for Environmental Chemistry and Ecotoxicology** (EVK1-2002-00519) based on Fifth Framework Programme, EC RTD project proposal for Programme “Energy, Environment, and Sustainable Development” which was focused on the support for the integration of Newly Associated States (NAS) in the European Research Area.

### Fields of expertise:

- Environmental chemistry
- Ecotoxicology
- Ecological and human risk assessment
- Environmental impact assessment
- Biostatistics and data evaluation

**Research activities** are focused on persistent, bioaccumulative and toxic substances (PBTs), their sources, their global, regional and local distribution, level monitoring as well as the modelling of their fate in the environment. Studies of the effects of PBTs include the toxic effects of metabolites of PBTs formed in vivo, specific ecological risk assessment activities based on available high quality multivariate environmental data, contributions to effective biomonitoring, development of new methods for studying carcinogenic potential of PBTs and including development of made to measure software, expert-systems, and interactive databases for environmental science.

A special attention is paid to **training, education and to the transfer of know-how**. Master and postgraduate curricula in the fields of environmental chemistry and ecotoxicology are offered within the RECETOX. Moreover, the International Summer School of environmental chemistry and ecotoxicology is organized yearly with a great success since 2005. Several international workshops and scientific conferences held every year provide another opportunity for establishment of the new contacts, cooperation and joint projects.

### Selected RECETOX/CEEPOPsCTR training activities

- Annual International Summer School
- Professional training in the field of environmental analytical chemistry provided to the scientists from Armenia (activity supported by the Czech Government) and Serbia (part of the APOPSBAL project).
- Post docs and Ph.D. students from Bulgaria and Belarus.
- Czech model passive ambient air monitoring network
- Pilot Central and Eastern passive air monitoring network

### **Selected long term national activities and projects:**

- Project TOCOEN - TOxic COmpounds in the ENvironment
- Project BETWEEN - The study of relationships BETWEEN environmental levels of pollutants and their biological effects
- Project IDRIS I, II - Regional and local ecological risk assessment
- Project INCHEMBIOL - INteractions among the CHEMicals, environment and BIOLogical systems and their consequences on the global, regional and local scales
- Project GF/CEH/01/003: Enabling activities to facilitate early action in the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs Convention) in Czech Republic. 2002 – 2004.

### **Selected international research activities:**

RECETOX Centre, awarded a title of EU Research Centre of Excellence in Environmental Chemistry and Ecotoxicology was/is a principal investigator of 8 international (UNEP Chemicals, UNIDO, EC, USA, Canada, Belgium, Norway) and of more than 40 national grants and projects since 1990, predominantly dealing with activities described further under the next heading (Activities of the CEEPPOPsCTR as defined by the decision SC-2/9).

- RECETOX acts as the implementation agency of Stockholm Convention in the Czech Republic (GEF/UNIDO project Enabling activities to facilitate early action in the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs Convention) in Czech Republic)
- RECETOX participated in the UNEP/GEF Project Regionally Based Assessment of Persistent Toxic Substances (co-ordination of region III - Europe)
- EMEP Programme of UN/ECE Convention CLRTAP
- EC DG Research 5th Framework Programme – Project APOPSBAL - Assessment of the selected POPs (PCBs, PCDDs/Fs, OCPs) in the atmosphere and water ecosystems from the waste materials generated by warfare in former Yugoslavia, 2002 – 2005
- Regionally Based Assessment of Persistent Toxic Substance - European Regional Report. UNEP Chemicals. Project GF/CP/4030-00-20, subproject: GF/XG/4030-00-86, 2001 – 2002.
- EC DG Research 5th Framework Programme - Centre of Excellence for Environmental Chemistry and Ecotoxicology, 2002-2005
- EC DG Research 6th Framework Programme – Project ECODIS - Dynamic Sensing of Chemical Pollution Disasters and Predictive Modelling of their Spread and Ecological Impact ”with acronym”.
- Polar Programme Norway - Expedition Svalborg - The Photochemistry of PBT Compounds in Ice, 2001 – 2002
- Cooperation with the Stockholm Convention Secretariat – POPsRC, BAT/BET Expert Group, TWG of Effectiveness Evaluation

**ACTIVITIES OF CENTRAL AND EASTERN EUROPEAN CENTRE FOR  
PERSISTENT ORGANIC POLLUTANTS/RECETOX IN THE FIELDS DEFINED  
BY TERMS OF REFERENCE FOR REGIONAL AND SUBREGIONAL CENTRES  
INCLUDED IN ANNEX I TO THE DECISION SC -2/9**

**Identified areas of technical assistance and technology transfer needs and priorities**

Priority consideration should be given to the provision of technical assistance and transfer of environmentally sound technologies relevant to:

**(a) Development, updating and implementation of the national implementation plans called for in Article 7 of the Convention**

RECETOX was responsible for the development of the Czech Republic's National implementation plan (NIP). The Czech National POPs Centre, which is a part of the RECETOX structure, is responsible national body for the realisation of the Czech NIP conclusions. RECETOX participated in the development and training activities connected with the NIP preparation in Armenia, Croatia, Egypt, Hungary, Macedonia, Oman, Serbia and Montenegro, Slovakia.

**(b) Review of available infrastructure, capacity and institutions at the national and local levels and the potential to strengthen them in the light of the Convention**

Regional POPs Centre for the Central and Eastern Europe together with Czech National POPs Centre is included within the organisational structure of the RECETOX, EU DG Research Centre of Excellence for Environmental Chemistry and Ecotoxicology which is a part of Faculty of Science, Masaryk University Brno, Czech Republic. The RECETOX uses 2 500 m<sup>2</sup> of the new university campus including 1 000 m<sup>2</sup> of chemical and ecotoxicological laboratories (trace analytical labs, student labs) as well as training and educational facilities. It also has an access to the observatory of the Czech hydrometeorological institute in Košice ČHMÚ Praha. The Centre owns a server (<http://recetox.muni.cz>) for the presentation of all activities and complete hardware and software support are additional advantages of RECETOX.

**(c) Training for decision-makers, managers and personnel responsible for issues related to the Convention in:**

- (i) Persistent organic pollutants identification**
- (ii) Technical assistance needs identification**
- (iii) Project proposal writing**
- (iv) Legislation development and enforcement**
- (v) Development of an inventory of persistent organic pollutants**
- (vi) Risk assessment and management of polychlorinated biphenyls (PCBs), dioxins and furans**
- (vii) Evaluation of social and economic impacts**
- (viii) Development of pollutant release and transfer registers**

Activities of RECETOX/CEEPOPsCTR in the field of inventories and monitoring are focused on:

- A common strategy - development of the regional research capacities, establishment of sampling, analytical and testing procedures based on the European standards;
- Addressing hot Central and Eastern European problems – missing inventory and monitoring data, elevated environmental levels and serious hot spots;
- Establishment of the POPs monitoring;
- Ecological and human risk assessment;
- Epidemiological studies;
- Effectiveness evaluation of the measures of international conventions at the regional level

**(d) The development and strengthening of research capacity at the national, subregional and regional levels, including:**

- (i) a development and introduction of alternatives to persistent organic pollutants, with special emphasis on reducing the need for specific exemptions**
- (ii) a training of technical personnel**

Activities of RECETOX/CEEPOPsCTR in the field of scientific research are focused on:

- A fate of POPs in the European region - source inventories, emission/deposition processes, long-range transport, transformation processes, bioavailability of POPs in terrestrial ecosystems, modeling of chemical fate in the environment at the local, regional and global scale with a special attention to the new types of chemicals and those with inadequate monitoring data;
- A development of new sampling and analytical methods for POPs;
- An effects of POPs on various types and levels of biota with the special attention to (1) the effects of environmental mixtures, (2) the “unknown” effects – phytotoxic effects, effects on soil microbial populations and soil fauna, aquatic biota, (3) a development of the mechanism-based biomarkers

**(e) A development of laboratory capacity, including the promotion of standard sampling and analytical procedures for the validation of inventories**

RECETOX has been active in the field of POPs determination for many years (see: <http://www.chem.unep.ch/databank/Search/Result.aspx> or <http://recetox.muni.cz> ). Its long-term scientific and research focus is on the development of sampling and analytical methods for determination of POPs (polycyclic aromatic hydrocarbons, organochlorinated pesticides, polychlorinated biphenyls, naphthalenes, short and medium chain chlorinated paraffins) in all abiotic and selected biotic matrices (mosses, needles, selected types of plants).

These methods have been applied on the European level in the long-term POP monitoring program in Kosetice observatory which is a station of the UN ECE EMEP POPs background monitoring network (since 1988).

Other monitoring studies are targeted on the occurrence and levels of POPs in regions with a special attention on the distribution of POPs in the vicinity of various industrial facilities such as industrial, municipal and medical waste incinerators, chemical and petrochemical companies, oil refineries, cement kilns etc.

RECETOX/**CEEPOPsCTR** can serve as a training facility for capacity building in developing countries. Summer school focused on the trends and advances in environmental chemistry and ecotoxicology is organized annually offering often specialized classes for the students with special interest besides the regular class. This special group was focused on environmental modelling in 2005 and it will be devoted to the practical aspects of monitoring in 2007.

**(f) The development, implementation and reinforcement of regulatory controls and incentives for the sound management of persistent organic pollutants**

RECETOX acted as a national implementation agency for development of the Czech National implementation plan of the Stockholm Convention. Currently, the Czech National POPs Centre is hosted by RECETOX. This national body responsible for the realisation of NIP conclusions and for the sound management of POPs in the CR was established as a joint activity of the Czech Ministry of Environment and Masaryk University Brno.

**(g) The identification and disposal of persistent organic pollutant wastes, including transfer of environmentally sound technologies for the destruction of such wastes**

As was already mentioned above, RECETOX research activities include the cooperation with the industry in the field of determination of possible environmental impacts of applied technologies and identification of potential hot spots. New monitoring tools are employed such as passive ambient air POP samplers based on the polyurethane foam as a sorption medium. This type of sampler was developed in the cooperation with Environment Canada and Lancaster University and represents very promising tool for POPs monitoring and determination. It has been used for development of the model passive POP monitoring network in the Czech Republic.

**(h) The identification and promotion of best available techniques and best environmental practices**

RECETOX/CEEPOPsCTR is a very active participant in the BAT/BEP Expert group. In cooperation with the Secretariat of the SC it organized the Regional workshop to raise awareness on the revised draft Guidelines on Best Available Techniques and Best Environmental Practices in Brno (02-04 October, 2006).

**(i) The identification and remediation of sites contaminated with persistent organic pollutants**

Remediation of highly contaminated sites such as Spolana Neratovice, and its potential impact on surrounding environment is yet another field of interest of RECETOX. Passive air samplers are used in this study as well among others, and with a special permission of Spolana company management the remediation site is a subject of several field experiments focused on the environmental fate of POPs.

**(j) The development and updating of a list of technologies that are available to be transferred to developing country Parties and Parties with economies in transition in accordance with paragraph 4 of the Article 12 of the Convention**

Activities of RECETOX/CEEPOPsCTR in the field of technical development are oriented on:

- The identification and disposal of POP containing wastes, including transfer of environmentally sound technologies for destruction of such wastes;
- The identification and remediation of POPs contaminated sites;
- Technologies for destruction, disposal, remediation and bioremediation of POPs;
- The identification and promotion of best available techniques and best environmental practices

**(k) The promotion of awareness-raising and information-dissemination programmes, including awareness-raising among the general public, of issues related to the Convention**

RECETOX gained an experience in coordination of international scientific activities in the frames of 5th Framework Programme APOPSBAL where it was a manager and coordinator of the joint project of Czech Republic, Slovenia, Croatia, Serbia, Bosnia and Herzegovina, as well as in frames of 5th Framework Programme Centre of Excellence focused on scientific networking in European region.

Professional training in the field of environmental analytical chemistry was provided to the scientists from Armenia (activity supported by the Czech Government) and Serbia (part of the APOPSBAL project). Post docs and Ph.D. students from Bulgaria and Belarus are a part of the RECETOX team. Annual summer school attracts the international students from many countries including the Southern and Eastern Europe.

RECETOX also cooperates with the Stockholm Convention Secretariat – POPsRC, BAT/BET Expert Group, TWG of Effectiveness Evaluation.

**RECETOX/CEEPOPsCTR education and training activities:**

- Development of the local laboratory capacity, including the promotion of standard sampling and analysis procedures for the validation of inventories;
- Cooperation in the process of the implementation of the Stockholm Convention and other international conventions;
- Professional training courses;
- Exchange Ph.D. students, postdocs, and staffs;
- Organisation of discussion tables, workshops, conferences, summer schools;
- Development of the scientific network as a platform for the information exchange;
- Joint projects;
- Training for decision-makers, managers and personnel responsible for issue related to the Stockholm Convention;
- Expertises for governmental and local authorities;

- The promotion information-dissemination programmes, including awareness-raising among the general public
- Development of the information databases;
- Development of expert systems;
- Website presentation of common activities.

**(l) The identification of obstacles and barriers to the transfer of technology and identification of the means to overcome them**

Suitable subjects need to be identified in all potential partner countries for future cooperation (research institutes, universities and government agencies willing to cooperate and establish a scientific network). Existing partnership with many European institutions from previous joint projects is another advantage of RECETOX.

**(m) Effectiveness evaluation, including monitoring of levels of persistent organic pollutants**

RECETOX has been participating in EMEP POPs monitoring programme since 1988.

Starting in 2005 passive air samplers have been employed to develop the long term monitoring network in Central and Eastern Europe. Polyurethane foam passive samplers were applied in 50 sites in the Czech Republic in 2005, a first phase of the pilot study in the Central and Eastern European countries was performed in Estonia (5 sampling sites), Latvia (5), Lithuania (5), Slovakia (11), Romania (15), and Serbia (7) in 2006. Second phase is currently running until September 2007 – Poland (12), Hungary (6), Slovenia (6), Croatia (5), Montenegro (7), Macedonia (6), Bulgaria (5), Moldova (6), Russia (5). Special one year pilot phase was performed in Fiji (from June 2006 to June 2007). Third phase of CEECs project will be performed from December 2007 together with the special campaign in Africa.

RECETOX and Central and Eastern European POPs Centre have organized together with the Secretariat of the Stockholm Convention the 1<sup>st</sup> Meeting of the Technical Working Group on Effectiveness Evaluation (09-12 October, 2006, Brno, CR).

**Regional POPs priorities where the RECETOX/CEEPOPsCTR can be established as a regional or subregional centre**

- air sampling techniques
- water sampling techniques
- analytical methods
- development of the monitoring network
- development of biotic sensors and toxicity testing
- environmental and human risk assessments
- fate of POPs in the environment,
- environmental transport
- models and inventories
- photo- and biodegradation of POPs



**Main goals and activities of the RECETOX/CEEPOPsCTR – May 2007 – 2008 – with the special attention to the goals and working plan of the SC, national implementation plans of the CEE countries, availability of the financial resources for the countries of the Region (preliminary budget and available financial sources)**

- Training courses and activities, summer schools
- Establishment of regional expert database
- Overview of existing financial sources
- Development of the activity plan
- The second phase of the PUF PAS project in the CEECs region
- Summer School 2007, 2008 – The advances and trends in environmental chemistry and ecotoxicology of persistent toxic substances with the special course focused on the monitoring of POPs
- Monitoring of POPs
- Development of the box model as a tool for evaluation of POPs contamination of various regions
- Participation on the SC activities – POPsRC, TWG
- Participation on the development of NIPs in the region – Serbia, Bosnia and Herzegovina

**Cooperation with other regional centres, cooperation with Regional Centre for the Basel Convention Implementation in Bratislava**

CEEPOPsCTR will promote the effective cooperation with other regional and subregional centres and with other relevant intergovernmental and nongovernmental organizations, and also with the Parties served by the centre, other relevant stakeholders in the region, the Secretariat of the Stockholm Convention and other relevant regional training centres, including the Basel Convention regional centres (Bratislava, Slovakia).

CEEPOPsCTR will encourage an exchange of information on persistent organic pollutants through the clearing-house mechanism referred to in paragraph 4 of Article 9 of the Convention.

CEEPOPsCTR plans the establishment of associated subregional centre in Macedonia and Russia.

**Countries of interest – the specification of the countries RECETOX/CEEPOPsCTR interest**

- UN Region of the Central and Eastern Europe (22 countries)
- Western Asia and Africa (e.g. previous cooperation with Sultanate of Oman, Egypt; new GEF project which will be focused on African region))
- Other countries (e.g, currently established cooperation with Fiji)

## Practical Information

### Legal status

CEEPOPsCTR is a part part of the structure of the RECETOX, which is one from the institutes of Faculty of Science, Masaryk University Brno, CR.

### Technical facilities

RECETOX/**CEEPOPsCTR** Centre is located in the new campus of Masaryk University, Kamenice 126/3, Brno. Centre with its activities occupies some 2 500 m<sup>2</sup>, part of which is 1 000 m<sup>2</sup> of renovated and recently equipped laboratories. RECETOX uses the Observatory of the Czech Hydrometeorological Institute located in Brno-Košetice for its field experiments and POPs monitoring.

Basic equipment of RECETOX laboratories is used in experimental activities including the research on the fate of organic pollutants in environment, toxicity mechanism studies, environmental chemistry, and ecotoxicology. There are laboratories for extraction and fractionation of environmental samples (Büchi automatic extractor, SFE extractor, gel permeation chromatography), and for chromatography and mass spectroscopy (GC-MS Hewlett-Packard - EI and CI, GCQ Finnigan, GC-ECD/FID and GC-FID/NPD Hewlett-Packard, LC-MS Triple Quad, HPLC-DAD and HPLC-FLD/DAD Hewlett-Packard, ICP-MS), sophisticated air sampling equipment (high volume air samplers Graseby Anderson, Smyrna, USA, and multifunctional air samplers URG, Chapel Hill, USA) is available. Photochemical laboratory equipped with cryostats, deep freezing boxes, photochemical reactors, and solar simulator serves for the photochemical transformation studies.

Ecotoxicology laboratories contain routine cultivation incubators, CO<sub>2</sub> atmosphere incubators, air conditioned cultivation chamber, AURA flow-boxes for sterile handling of biological material, basic equipment for sample preparation and separation (temperature-controlled centrifuges JUAN, shakers, sterilizers, electrophoretic systems), and for biological parameters and enzymatic activity evaluation (UV-VIS spectrophotometer VARIAN, microplate spectrophotometer TECAN, luminometer TECAN).

The RECETOX owns all hardware and software needed for its activities, and uses own information server <http://recetox.muni.cz> for the presentation of its activities. It will be used for the presentation of all activities of the **CEEPOPsCTR**.

### Working languages

English, Russian

### Staff

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Administration: Hana Kordačová, Lydie Tupová

- External board of advisors from EU member countries, USA, Canada
- Expert database from CEECs and other countries
- + RECETOX staff based on the actual projects

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