



RECETOX NEWSLETTER

RECETOX NEWSLETTER is a quarterly newsletter by the Research Centre for Toxic Compounds in the Environment (RECETOX), Brno, Czech Republic.

Learn,
discover,
prove
and apply



RECETOX is an independent REsearch CENTre for TOXic Compounds in the Environment operating within the Faculty of Science, Masaryk University, Brno, Czech Republic. The Centre fulfils three roles: an academic institution providing university education, a research institution working on transformation of research into practical applications and a body supporting implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) and of sound chemicals management in general, nationally and internationally.

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- Past Meetings and Training Courses
- Cooperation of the Year
- Second CEE Regional Monitoring Report



Editorial

Dear readers,

We are again pleased to report the awards given to our scientists and teams for their scientific excellence and successful collaboration with industry.

Summer and autumn were very busy at RECETOX. There was no time to rest, because we continuously went from event to event from June to the end of October 2014. RECETOX welcomed more than 250 people from the Czech Republic and abroad over last four months, including the for successful 10th RECETOX International Summer School. Our researchers and experts trained incoming international participants from Libya, Turkey, and the Balkan countries, lectured in meetings of international expert panels and organizations, as well as in a number of prestigious international scientific conferences. All the above took place in addition to the traditional daily business of a researcher - work in laboratories and in the field, preparation of papers and processing of new project applications.

In all this bustle, we wonder where the time goes as we look at the rapidly changing months in the calendar. Even though we did not manage a proper welcome to new students and to the 2014-2015 academic year in our newsletter, we would like to take this opportunity, albeit slightly in advance, to wish everyone a successful start to 2015.

Enjoy reading and we look forward to your feedback!
Katka Šebková, on behalf of the editors

PS - The RECETOX newsletter is also available automatically if registered through www.recetox.muni.cz or newsletter@recetox.muni.cz and is published in English, Czech and Russian. The next issue will be released in February 2015.



Calendar of Events

- 8-9 July 2014 **EDC Experts Meeting, WHO ECEH**, Bonn, Germany
- 21-27 September 2014 **study visit of Turkish experts to Czech Republic**, Prague and Brno
- 23 September 2014 **EUROCITIES EDF Brno visit to RECETOX**, Brno
- 7-8 October 2014 **meeting of the CEE ROG at RECETOX**, Brno
- 8-10 October 2014 **WHO CRAN members, 1st meeting**, ANSES, Paris, France
- 20-24 October 2014 **Training course for secondary school teachers**, RECETOX, Brno
- 22-23 October 2014 **DENAMIC project partners meeting**, RECETOX, Brno
- 27-30 October 2014 **POP Review Committee**, POPRC 10, Rome, Italy
- 3-8 November 2014 **6th meeting of the INC (Minamata Convention)**, Bangkok, Thailand
- 10-13 November 2014 **Global Coordination Group meeting (GMP)**, Geneva, Switzerland
- 19 November 2014 **18th meeting of the Council of National Centre for Toxic Compounds**, Prague, Czech Republic
- 27-28 November 2014 **Annual meeting of SC and BC Regional Centres**, Geneva, Switzerland
- 24 November-5 December 2014 **Training POPs analyses in Environment Samples**, RECETOX, Brno
- 3 December 2014 **TEMPUS NETREL, annual meeting**, RECETOX, Brno
- 9 December 2014 **INDNOPOP conference**, New Delhi, India
- 14-17 December 2014 **2nd Meeting Open-Ended Working Group**, SAICM, Geneva, Switzerland



Courses in RECETOX

Training for Secondary School Teachers



The fourth “Open Science” project provided practice-oriented training courses for secondary school science teachers. Project supervisors from universities (academics, teaching staff and researchers) prepared a comprehensive set of tutorials for chemistry, biology and physics laboratory courses that teachers themselves tested in state-of-the-art laboratories at research institutions in autumn 2014. A fully booked five-day chemistry course held in our Centre from 20–24 October 2014 provided 20 secondary school teachers with morning lectures and afternoon practical exercises in the RECETOX laboratories. The project introduced to teachers new modern tools and aids, teaching methods, equipment and experimental approaches that can later be used in their own laboratory classes.

Visit www.otevrena-veda.cz for more information about the Open Science project.

Cooperation with Grammar School in Břeclav



The Grammar School and Language School in Břeclav, Czech Republic cooperated with the RECETOX Centre on the occurrence and distribution of chemicals between water and the organic phase of sediment at five sampling sites on the Dyje (Thaya) River in the Czech Republic. This cooperation and research was carried out within the project “Promoting science and technology education in secondary schools in the South Moravian Region” supported by the Operational Programme Education for Competitiveness. Břeclav students had the opportunity to accompany a RECETOX sampling technician throughout a year and prepare photo-documentation of sampling sites, sampling procedures, and laboratory processing of collected samples. The concentrations of polar and non-polar chemicals in the aquatic environment samples were determined by analytical methods. Students revisited RECETOX laboratories in autumn to receive the results of analyses and their interpretation in order to complete the study.

Training and Courses for Participants from Abroad

Two RECETOX researchers (Pavel Čupr, Katarína Bányiová) participated in health and environmental risk assessment of potential releases of wastes from hydrolytic destruction of mustard gas stored in dedicated locations in Libya. They lectured medical students and analytical chemists from Libya (CW / HAZMAT Accident Response Training Program for Libya) in Western Bohemia on the transfer of chemicals through the skin and on sampling techniques for environmental monitoring.

A delegation of Turkish ministry and industry representatives visited Prague and Brno from 21–27 September 2014. The study visit supported the implementation of chemical management in relation to persistent organic pollutants. RECETOX experts, Czech government officials, and company representatives shared their experience on design and operation of monitoring programs, implementation of legislative and non-legislative instruments, and on national-level cooperation between government, the public and industry to reduce risks associated with chemicals.

A two-week-long laboratory course for experts from Egypt on the analyses of toxic substances in water and sediments will take place in the end of November 2014.





Meetings in RECETOX

DENAMIC Project Partner Meeting

A two-day conference of the DENAMIC (Developmental Neurotoxicity Assessment of Mixtures in Children) project supported by the EU 7th Framework Programme was held at RECETOX from 22–23 October 2014.

Thirty-five scientists from 10 European universities and research institutes attended the lectures and set targets and timetable for further cooperation for two teams on the scientific analysis of biological samples from European cohorts and on toxicology and proteomics.



Conference participants also visited the laboratories and premises of the RECETOX Centre and the Mendel Museum.



Eurocities in RECETOX and RECETOX for Eurocities

On 23 September 2014, the RECETOX premises and laboratories welcomed 40 representatives of EUROCITIES (European cities of over 250 000 inhabitants) attending the annual meeting of the Economic Development Forum held in Brno from 22–24 September 2014. The visitors wanted to see and experience the new facilities for science and research built for the University Campus in Bohunice.

In addition, Kateřina Šebková, Ph.D., Director of the National Centre for Toxic Compounds spoke at the forum conference on “The added value of cooperation in metropolitan areas” on 24 September 2014. She explained that supporting science and research has a positive impact on the development of cities and metropolitan areas in terms of innovation, social aspects and increased quality of life.



RECETOX research infrastructure provides OPEN-ACCESS to Czech and international researchers to work on their projects and use the expertise and instrumentation available in our Centre.

Visit www.recetox.muni.cz/RI for the application procedure.

For more information, please contact Dr. Petra Růžičková, infrastructure coordinator (ruzickova@recetox.muni.cz).





RECETOX News

Prize for RECETOX in Cooperation of the Year 2014

The American Chamber of Commerce in the Czech Republic and the Association for Foreign Investment, in cooperation with the Technology Agency of the Czech Republic, organized the fourth year of the Cooperation of the Year contest. This contest focused on the best cooperation between companies and the research sector. This year, 22 projects from seven universities, eight research institutes, and 28 private companies competed for the prize of 100 000 Czech crowns.

We are proud to announce that second place was awarded to the project “Biosensor for monitoring toxic substances in the environment”, created jointly by the Loschmidt Laboratories, the Institute of Experimental Biology, and RECETOX (all from the Faculty of Science, Masaryk University) through cooperation with the companies Photon Systems Instruments (PSI) and Enantis. We congratulate all partners in this project on their major achievement and wish them further success!

The award-winning biosensor prototype is used for monitoring the occurrence of toxic halogenated substances (widely used in industry) in the environment and, in particular, in water. The biosensor can detect the presence of contamination on-site in real time, without the need for sampling, transport, and sample treatment required by traditional analytical approaches. Other features that favour the biosensor over traditional technologies are a low cost of analysis (€1 per analysis), easy use, and an option of fully automated measurement using the GSM connection. At present, a similar portable device is not commercially available, so there is a large application potential and a market gap in the Czech Republic and abroad. The launch of the biosensor is planned for early 2016.

In giving its rationale for selecting this project, the jury stated, “Among other things, this project was successful because it combined two research fields. We favourably viewed the fact that its result can be very rapidly put into operation in sixty countries where there is demand for a fast and inexpensive solution. In addition, this is a textbook example of cooperation between a university and a firm.”

The development of this biosensor, however, extends to other areas than those for which it is primarily intended. The activ-

ity of biosensor enzymes to mustard gas opens doors for the tool to be adapted for the detection of hazardous substances in both security and defence (military) technologies. A grant by the Technology Agency of the Czech Republic provides follow-up support for the further development of the biosensor. It should yield a new product line applicable in environmental, agricultural, industrial, and military sectors/fields.

Prepared using the official press release.
Visit www.spolupraceroke.cz for more information.



Biosensor for monitoring toxic substances in the environment



Representatives of Huawei, RECETOX and Enantis, PSI, and Association of Foreign Investment (from left). Photo courtesy of www.spolupraceroke.cz

Rudolf Lukeš Award



The Rudolf Lukeš Award for excellent results of international importance in the field of organic, bioorganic, and medicinal chemistry of the Czech Chemical Society is awarded since 2012 in cooperation with Lach-Ner Ltd. As recipient of the 2014 award, the international jury chose Professor Petr Klán, Ph.D., head of the research programme on organic photochemistry and supramolecular chemistry at RECETOX. The prize is awarded solely on the basis of major scientific achievements in the last five years published in prestigious international journals. We would like to join others in congratulating Professor Klán!



New Papers Published

The publishing rate of RECETOX research outcomes in prestigious peer-reviewed journals almost doubled compared with same time in 2013. So far, 81 research papers were published by October 2014, such as, for example:

Degrendele, C. et al. (2014) Size specific distribution of the atmospheric particulate PCDD/Fs, dl-PCBs and PAHs on a seasonal scale: Implications for cancer risks from inhalation. *Atmospheric Environment* 98: 410-416.

Havel, V. et al. (2014): Water-mediated inclusion of benzoates and tosylates inside the bambusuril macrocycle. *Chem. Commun.*, 2014, 1372 - 1374.

Chaloupkova, R. et al. (2014) Structural and functional analysis of a novel haloalkane dehalogenase with two halide-binding sites. *Acta Crystallographica D* 70: 1884-1897.

Jonáš, A. et al. (2014) Retinoid-like activity and teratogenic effects of cyanobacterial exudates. *Aquatic Toxicology* 155: 283-290.

Krausko J. et al., Observation of a Brine Layer on the Ice Surface by Environmental Scanning Electron Microscope at Higher Pressures and Temperatures. *Langmuir* 2014, 30, 5441-5447.

Lahoda, M. et al. (2014): Crystallographic Analysis of 1,2,3-Trichloropropane Biodegradation by Haloalkane Dehalogenase DhaA31. *Acta Crystallographica D70*: 209-217.

Liu, L.Y. et al: Differences in spatiotemporal variations of atmospheric PAH levels between North America and Europe: Data from two air monitoring projects. *Environment International* 2014, 64, Pages 48-55

Maňáková, B. et al. (2014) Effects of combined composting and vermicomposting of waste sludge on arsenic fate and bioavailability. *Journal of Hazardous Materials* 280: 544-551.

Mulder, M.D. et al. (2014) Air-sea exchange and gas-particle partitioning of polycyclic aromatic hydrocarbons in the Mediterranean. *Atmos. Chem. Phys.* 14: 8905-8915.

Vrana, B. et al. (2014) Passive sampling: An effective method for monitoring seasonal and spatial variability of dissolved hydrophobic organic contaminants and metals in the Danube river. (2014) *Environmental Pollution* 184,101-112.


Contest Announcements and New Website

The National Centre for Toxic Compounds at RECETOX, in cooperation with the Ministry of Environment (Department of Environmental Risks and Ecological Damage and Department of Multilateral Relations), has organized the national contest SYNERGIES 2014 for all young people in the Czech Republic between 12 and 25 years old. The contest aims to map the diet of the young population and increase awareness of tools for protecting human health and the environment from chemicals. The contest is organized to celebrate the tenth anniversary of the entry into force of the Stockholm Convention on Persistent Organic Pollutants, the first anniversary of the signature of the Minamata Convention on Mercury, and to bring attention to national activities strengthening cooperation and coordination of activities on chemical management. The con-

test runs on-line until 5 December 2014 at www.synergie-chemie.cz/soutez.

The foundation Partnerství, located in Brno, announced the fourth year of competition for university students. The competition "Pro vodu" - the Nestlé Prize for innovative projects on water management/use - is suitable for students and new graduates who addressed responsible use of water, or its environmentally friendly treatment and reuse in their semester, bachelor or master's thesis. The deadline for applications is 12 February 2015. For more information visit www.soutezprovodu.cz.

Do you want to know more about the management of chemicals and cooperation in the Czech Republic? Visit our new portal www.synergie-chemie.cz. Please note that it is in Czech only, as it aims at a Czech-speaking audience.

 Spolupráce
při nakládání
s chemickými látkami v ČR

Short Announcements

We are happy to announce the birth of two boys in families of our young staff during summer 2014. Congratulations to Jana Oudová on the birth of her son Richard, and to Ondřej Mikeš on the birth of his second son Mirek.



RECETOX Activities Abroad and in the CEE region

Training Academic Staff in Bosnia and Herzegovina

A three-year long (end of 2012–end of 2015) project financed by the EU TEMPUS Programme established a Training Network of experts (NETREL - Network for education and training for public environmental laboratories) to build capacities for researchers and experts in Serbia and in Bosnia and Herzegovina to become trainers in environmental analytical techniques.

RECETOX provided a series of theoretical and also practical training courses to academic staff in 2014. The participants from four universities from Western Balkan countries (Serbia and Bosnia and Herzegovina) receive information on state-of-the-art methods for monitoring priority and river basin-specific pollutants according to the EU Water Framework Directive 2000/60/EC.

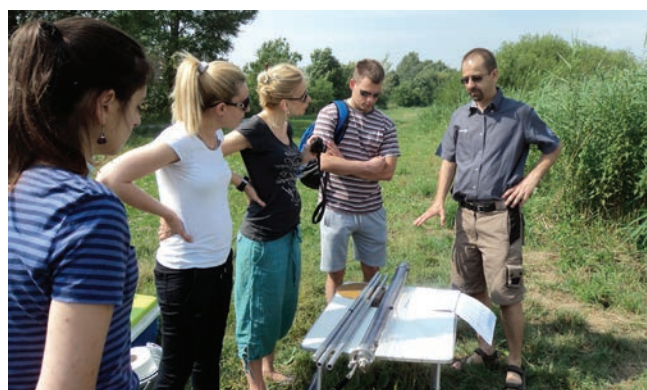
In June 2014, Associate Professor Zdeněk Šimek from RECETOX, together with Professor Graham Mills from the partner University of Portsmouth UK, organised a series of two week-long intensive learning courses on separation methods in environmental analysis. These courses took place at the University of Sarajevo and the University of Belgrade. In September 2014, RECETOX provided yet another learning course

addressing validation of analytical methods for the analysis of aquatic pollutants.

Besides dissemination of theoretical knowledge, RECETOX also organised a series of three week-long hands-on training courses in the RECETOX laboratories, dealing with sampling and sample preparation (organised by Brano Vrana and Roman Prokeš), and instrumental analysis by HPLC of aquatic pollutants (organised by Zdeněk Šimek, Jitka Bečanová and Jiří Kohoutek). These courses allowed visiting researchers from universities in Banja Luka, Belgrade, Novi Sad, and Sarajevo to improve their practical skills in state of the art analytical techniques.

In addition, a progress meeting of the NETREL project will take place in early December 2014 in Brno.

As a follow-up, the newly trained trainers from Western Balkan countries will organize their national training courses for the staff of local government laboratories dealing with analysis of the environment, under the supervision of our experts in late 2014 and throughout 2015. For more information on NETREL see its website www.netrel.uns.ac.rs



Levels of POPs in CEE Region

The Stockholm Convention Regional Centre in RECETOX provides support to the Regional Organization Group of the Central and Eastern Europe established under the Global Monitoring Plan to the Stockholm Convention on Persistent Organic Pollutants by collecting, analysing, and visualizing available data on POPs levels in air and water gathered via MONET passive sampling networks, and shown at www.genasis.cz. In addition, it also supported drafting of the CEE regional monitoring report. Members of the CEE ROG met in Brno from 7–8 October 2014 to discuss the draft of the second monitoring report on POP levels in 23 Central and Eastern European countries.

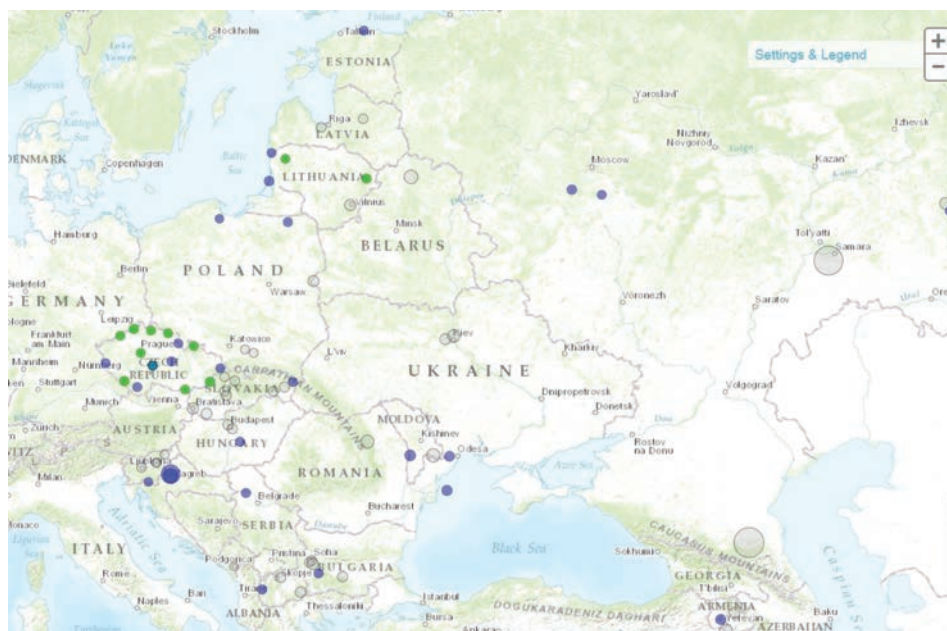
Professor Ivan Holoubek, CEE ROG coordinator, commented on the findings in the report: “POPs data availability and com-

parability in the CEE region increased since 2008. Air data are generated through EMEP, GAPS and RECETOX – MONET strategic partnerships. Results indicate decreasing trends in POP air concentrations on sufficiently long passive sampling time series (minimum 5 years) for HCB, PCB, DDT, alpha, beta and gamma HCH and PeCB in several countries of the CEE region. Human tissues data are available only through the WHO and UNEP/WHO surveys, with certain information gaps identified for South European and Central Asian part of the region. A decrease in levels was observed for some chemicals, but data on the newly listed POPs are limited.”

The final version of the report contains information on the occurrence of 23 chemicals currently listed in the Annexes of the Stockholm Convention in CEE region between



1990s and 2013, and will be available in February 2015 in advance of the next meeting of the Conference of the Parties in May 2015 in Geneva, Switzerland. Information will also be available online www.pops-gmp.org/visualization2014 once the final report is published.



Trends observed in the CEE region for changes in alpha-HCH concentrations between 1996-2014. Decreasing trend is marked in green, statistically non-significant trend in blue, and no trend in grey. (source: GMP DWH)

WHO Workshop on Endocrine Disrupting Chemicals



The World Health Organization convened an expert meeting in Bonn, Germany from 7–8 July 2014 to discuss exposure and disease surveillance methodologies for health risk assessment of endocrine disrupting chemicals (EDCs). The Regional Centre of RECETOX was asked to prepare supporting documentation and present its outcomes at the meeting.

The final meeting report will be published on the WHO website in early 2015. In addition, meeting outcomes will be disseminated through scientific journals. Resulting capacity-building activities will take place, engaging WHO Collaborating Centres, and medical professionals' societies.

RECETOX in the WHO Chemical Risk Assessment Network

The World Health Organization established a Chemical Risk Assessment Network (CRAN) of institutions in 2013 to improve global chemical risk assessment. This network is a forum focusing on harmonization of health risk assessment including the science of risk assessment, development of methodologies for a WHO toolkit and sharing of available validated information in chemical risk assessment.

We are happy to announce that RECETOX was invited to be a member of the network, which we did in summer 2014. The first meeting of the CRAN took place in Paris, France from 8–10 October 2014. All members presented their institutions and activities in relation to the network. There were presentations by 55 chemical risk assessment institutions from 29 countries. Among others items, the meeting supported the establishment of an international coordinating forum on combined exposures to chemicals and further developed the CRAN work plan.



Photo courtesy by WHO and ANSES



Trace Analysis Laboratories



Use the Accredited Laboratories and their infrastructure for the following services:

- Speciation **analyses** of toxic and essential elements in the environment and biota
- QA/QC system, validated analytical methods
- Modern equipment for extractions, fractionations and purification of samples
- State of the art instrumentation for analyses of endocrine disrupting chemicals, persistent organic pollutants, dioxins, furans, brominated flame retardants, steroids, explosives, and heavy metals

Long-term monitoring – air, precipitation, soil, water, sediments, needles, mosses and lichens

- Air monitoring networks – MONET in Europe, Africa and Asia
- Sampling by active and passive samplers
- Sampling of precipitation and surface waters, sediments, soils and biotic materials

Capacity building – made to measure training for laboratory experts on various instrumentation

Contact Dr. Petra Příbylová (pribylova@recetox.muni.cz) for more information.



Visit www.genasis.cz and its data browser to find out more about levels of toxic chemicals around us!

The GENASIS (Global ENvironmental ASsessment Information System) created in cooperation of RECETOX with IBA MU - institutes of the Masaryk University, Brno, Czech Republic - provides a comprehensive information on contamination of the environment by chemicals, namely persistent organic pollutants (POPs). The system combines expertise, validated data from partner institutions, input from regular environmental monitoring programmes. Users and data providers get secure data repository, sophisticated analytical tools, and comfortable data management and visualization.

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