



RECETOX NEWSLETTER

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

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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 fulfills 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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- ▶ Norwegian Funds and EEA Grants Support RECETOX Mobility
- ▶ Particles in Urban Ambient Air
- ▶ Introducing New Researchers



Editorial

Dear readers,

Spring is in the air and this invites us to be more active and spend time outdoors, as well as to travel in many directions. Thanks to support provided by the Norwegian Funds and EEA grants a number of young researchers from our centre will head north to Scandinavia to enhance cooperation with Norway and Iceland and gather knowledge to be further used in their research. At the same time, new international researchers and post docs have arrived to Brno from abroad to benefit from our research infrastructure, state of the art facilities and expertise to share their knowledge with us and to start building joint cooperation in international projects.

Moreover, the quantity of events taking place in RECETOX also increases as spring blooms at its best – an international meeting of monitoring experts will take place in March, the joint secretary of the Basel, Rotterdam and Stockholm Convention (high representative of the UNEP) will visit RECETOX, and the 12th meeting of the Czech-Slovak Conference Air (Ovzduší) will take place in April. Finally, 11th International Summer School on Toxic Compounds in the Environment will take place in the second half of June. This year it focuses on ecotoxicology and cyanobacteria, however the topic of monitoring, sampling and analyzing samples and data relevant to the Global Monitoring Plan under the Stockholm Convention will not be neglected. Both RECETOX staff and invited international lecturers will join forces to share their knowledge in this traditional capacity building activity of our Centre with participants around the globe. We look forward to meeting you in some of our spring activities!

Enjoy reading and spring 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 newsletter@recetox.muni.cz. It is published in English, Czech and Russian. The next issue will be released in June 2015.



Calendar of Events

- ▶ 21 and 27 January 2015 **Open Door Days, Faculty of Science, Bohunice Campus, Brno**
- ▶ 17–19 February 2015 **Regional Meeting on updates of the National Implementation Plans, Bratislava, Slovakia**
- ▶ 6–8 March 2015 **N-trophy Finale, contest for secondary school students, Brno Bohunice**
- ▶ 17–19 March 2015 **Expert meeting in preparation of the global report under the Stockholm Convention Global Monitoring Plan.**
- ▶ 7–8 April 2015 **regional workshop in preparation for triple COP, Bratislava, Slovakia**
- ▶ 9–10 April 2015 **regional workshop, early implementation of the Minamata Convention, Bratislava, Slovakia**
- ▶ 14 April 2015 **19th meeting of the interministerial Council of the National Centre for Toxic Compounds, Ministry of Environment, Prague, Czech Republic**
- ▶ 20–22 April 2015 **12th International Conference Air 2015 (Ovzduší), Žebětínský dvůr hotel, Brno, Czech Republic**
- ▶ 30 April 2015 **Business Research Forum of Masaryk University, CEITEC, Brno**
- ▶ 1–5 May 2015 **SETAC, Barcelona, Spain**
- ▶ 4–15 May 2015 **joint meeting of the Conferences of the Parties to the chemicals and waste conventions (triple COP), Geneva, Switzerland**
- ▶ 7–9 May 2015 **Science Fair at the triple COP, Geneva, Switzerland**
- ▶ 21–22 May 2015 **international workshop on SAICM and priorities of the health sector by 2020, ECEH Bonn, Germany**
- ▶ 15–20 June 2015 **11th International Summer School, RECETOX, Brno, Czech Republic**
- ▶ 23–24 June 2015 **international workshop on Involvement of the health sector in the implementation of the Minamata Convention on Mercury, WHO ECEH Bonn, Germany.**



Mobility 2015

Students and Junior Researchers Head North



Katarína Bányiová

Six staff of the RECETOX Centre received projects supported by the Norwegian funds and EEA grants promoting the international mobility of students and researchers. They will travel to Norway or Iceland in the first half of 2015. Additional information about the funding sources and project proposal calls is available here: <http://eeagrants.org/Who-we-are>

A junior researcher, Marie Smutná will spend nine weeks at the Norwegian University of Science and Technology in Trondheim in the Department of biology, molecular and cellular toxicology under the leadership professor Augustine Arukwe. The two-month internship provided by the Norwegian Funds (bilateral Scholarship Programme, education sector staff placements) will ensure transfer of information about Prof. Arukwe’s team research on fish and amphibians, as well as acquiring new methods that could be further employed in the continuation of her project back home. In addition, she will also participate in the 18th Conference on Pollutant Responses in Marine Organisms – PRIMO 18 and present the results of her work on a project funded by the Czech Science Foundation (GAČR) on environmentally-relevant cyanobacteria as producers of retinoid compounds.

Another junior researcher, Dr. Ondřej Mikeš told us: “I will spend a total of four months in the National Institute of Public Health, NIPH in Oslo and at the Akershus University College of Applied Sciences (support provided by EEA + Norway Grants). The NIPH is coordinator of several long-term studies and cohorts that are similar to the Czech ELSPAC (European Longitudinal Study on Pregnancy and Childhood), in particular, the MoBa study (mother-child) investigating the



Anežka Nečasová



Ondřej Mikeš



Lucie Bielska



Marie Smutná

links among social, genetic and environmental effects/determinants of the child development. We expect to create toxicological patterns/models derived from data of the dietary habits the ELSPEC study participants and known concentrations of various contaminants in food while in Norway. These patterns will be subsequently compared to some of the health outcomes. It is probable that exposure groups thus formed will also reveal groups of population at risk based on the food consumption. I look forward to this research visit very much.”

Ph.D. student Anežka Nečasová, a member of the Human Exposure Assessment and Risks research group at RECETOX will stay at the University of Oslo, Institute of Basic Medical Science for two months in the summer 2015. The support from Norwegian Funds will allow her to learn new methods for genotoxicity evaluation, which will be useful for prediction and risk assessment to humans when she returns back to the Czech Republic. Her projects also study genotoxic effects of UV filters (sunscreens).

Ph.D. student Lucia Škulcová and junior researcher Lucie Bielská will both travel to the Norwegian University of Life Sciences and the Norwegian Geotechnical Institute in Oslo for two months (support provided by Norway grants). Lucia's aim is to enhance her skills and knowledge in the field of bioavailability assessment in the soil, which will help in preparing for her Ph.D. thesis. Within the project, she will test new strategies and techniques that have the potential to estimate the risk of soil contamination by pesticides and evaluate the potential to re-cultivate these polluted sites.



Lucia Škulcová

Lucie Bielská will test novel approaches and strategies to reliably predict risks of contaminated soils and to effectively re-cultivate polluted sites. Since one of the proposed re-cultivation methodologies contributes to carbon sequestration, her project also targets the issue of the climate change.

Last but not least, the Faculty of Pharmaceutical Sciences of the University of Iceland will host our Ph.D student, Katarína Bányiová for nine weeks (support provided by EEA grants). Katarína will spend her time in the team of Professor Thorsteinn Loftsson working on methods used in permeation of chemical compounds through biological membranes, pharmacokinetic modelling and data evaluation approaches.

New Project - DA VINCI

The DA VINCI project is not about art and painting, but about strengthening scientific cooperation between the Czech Republic and Norway. EEA and Norwegian Funds launched a call for proposals in the second half of 2014. The RECETOX Centre successfully bid therein for a new project on the Biodiversity and Ecosystem Services & Environmental Monitoring and Integrated Planning Control & Adaptation to Climate Change Programme. The implementation of the DA VINCI (DATA Visualisation, INterpretation and Comparison Improvements for organic pollutants in long-term monitoring networks) project started in January 2015. The project is undertaken in cooperation with NILU, the Norwegian Institute for Air Research until March 2016.

The aim of the bilateral cooperation in the DA VINCI project is to contribute to the methodology of interpretation of globally available data on air contamination by persistent organic pollutants (POPs) and to develop a more accurate analysis of their long-term trends. In addition, uncertainty resulting from various data sources will be identified as well as new ways to compare data across monitoring programmes and sampling methods. The outputs and results will be made available to both experts and the general public.





Airborne Particles in the Environment

Monitoring Particles in Urban Ambient Air

High concentrations of particles (PM 2.5) in ambient air measured either at official long-term sampling sites by the hydrometeorological agency or by mobile devices in impacted areas are reported relatively often in the news and in the press, particularly in autumn and winter. RECETOX wishes to inform objectively about the situation in the city and investigate it in the long term, and therefore a continuous particle sampling device provided by the CETOCOEN project was put in operation in Brno Bohunice in 2014. The equipment collects samples of small aerosols and particulate matter (PM 2.5) in the air and displays the measured concentration of PM 2.5 levels on a large screen on the roof of the A29 building (see Figure 2), also showing date, time and current temperature. The SHARP 5030 sampler (see Figure 1) analyzes the collected aerosol particles according to the US EPA standard method (EQPM-0609-184).

In addition, longer term results are also shown on the LCD panels inside the RECETOX premises. They show a 10 day record of the temperature (blue bars) and concentration of air-

borne particles (point curve) in aggregated values (see chart in Figure 3).

Figure 2. Large screen on the roof of the RECETOX premises



Figure 1. The SHARP 5030 sampler

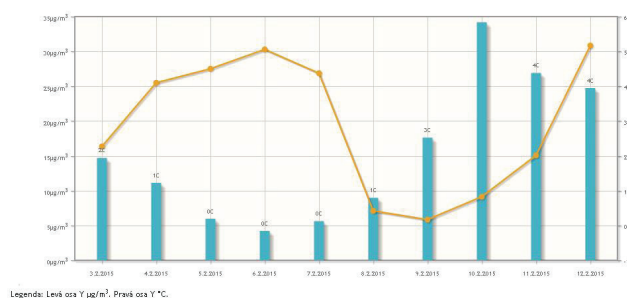


Figure 3. Temperature and concentration changes over time (aggregated values)

Prašnost PM 2.5 (aktuální hodnota)	26 µg/m ³
Venkovní teplota (aktuální hodnota)	3.8 °C

Aktuální hodnota naměřena v Brně, ulice Kamenice v 11:10:21 13.02.2015.

Grafický přehled průměrných hodnot v čase



Legenda: Levá osa Y µg/m³, Pravá osa Y °C.

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

About the WaterChem Project



Johanna Rajasärkkä, PhD. in the laboratory, RECETOX archive

The first newsletter of 2014 contained an article about three new research projects at RECETOX supported by the South Moravian Programme for Distinguished Researchers (SoMoPro) between 2014 and 2016. That article provided a brief abstract of each project and mentioned that individual projects will be introduced in the future in greater detail. Thus, the text below gives the opportunity to Dr. Johanna Rajasärkkä, our new colleague from Finland who joined our Centre in November 2014, to give us news about her research and the WaterChem project.

Implementing the WaterChem SoMoPro Project

The project WaterChem aims to measure organic chemicals that can leach into drinking water from new plastic (polyethylene) pipes and epoxy resin coatings that are used to renovate water pipes in private houses. A number of target chem-

icals, for example the endocrine disruptor bisphenol A, and other volatile chemicals causing unwanted odour and taste, will be measured before and after house refurbishment. The changes in water chemical content are monitored all the way from drinking water treatment plant to the consumers' tap. Water samples are collected in both Finland and Czech Republic. Both the traditional water sampling methods as well as a novel passive sampling techniques are applied to the study. The impact of plastic materials and epoxy coatings on water chemical content in private and communal drinking water distribution systems will be evaluated. The results will contribute to the on-going development of EU-wide testing standards for construction materials in contact with drinking water, as well as the missing knowledge of long-term effects of these materials on drinking water chemical quality.

Johanna also told us about the preparation for the project and experience of living in the Czech Republic so far: "The grant call of the SoMoPro II programme was conveniently released right after my dissertation. We decided to prepare an application together with my dissertation opponent, Prof. RNDr. Luděk Bláha. With the family's full support it is really great to go work on a postdoc project abroad. In relation to the family life the timing of the project is perfect: the older kid is not yet at school age, and the younger one enjoys staying home with her father, who is happy to take a family leave from hectic work life. Our settling in to Brno has been relatively easy thanks to the help and advice by Ms Martina Šatinská from the EURAXESS centrum, as well as personnel at RECETOX, and many other nice people like our landlord. Language is still tricky for us, but we are learning more and more every day."

Our New Researchers from Abroad

Three young researchers from Australia, the Netherlands, and Sweden started working at RECETOX from the beginning of 2015. We have asked them to share with us information on their studies and background and to briefly introduce their field of work at RECETOX.

Petra Booijs has a PhD in environmental chemistry and started at RECETOX in January 2015. From 2001 until 2015 she was employed at the Institute for Environmental studies at VU University in Amsterdam, The Netherlands. Her main focus was on method development and chemical analysis of environmental contaminants using GC - and LC-MS. In December 2014 she defended her PhD thesis on the identification of key chemical contributors to the toxic pressure on microalgae in Dutch estuarine and coastal waters. At RECETOX, she will mainly focus on method development for non-target screening and profiling to identify indoor contaminants in relation

to human exposure risk assessment. She is coordinator of the non-target screening group at RECETOX.

Pernilla Carlsson is a postdoctoral researcher at RECETOX working on the OPVK project at Masaryk University (funded through the Operation Programme Education for Competitiveness, OPVK) and is currently involved in the work of Branislav Vrana's group. Therein she is developing sampling strategies for passive sampling of water and fish sampling for legacy and emerging compounds. Perineia is also involved in the non-target screening group - i.e. "the analyses of everything we may not know as of yet". Her background is environmental chemistry and she received her Ph.D. at the University Centre in Svalbard (UNIS) where she investigated how persistent organic pollutants (POPs) are transported in the Arctic marine food-web in relation to climate change. Then she worked for the Arctic Monitoring and Assessment Programme (AMAP) and will be involved in writing future re-



ports for them as well. Dr. Carlsson's main motivation to come to RECETOX was the good laboratory facilities and the skilled people already working here.

Eva Holt has a PhD in Environmental Chemistry from the University of Queensland. Most recently she worked for the Queensland Government assessing the risk of large development projects (coal mines, coal seam gas, power plants) on aquatic environments. Eva's PhD topic was investigating the environmental release of dioxins associated with the use of pesticides. She worked as a research assistant at the National Research Centre for Environmental Toxicology during her term as an undergraduate and graduate student on a variety of different projects, including the National Dioxin Program, in the groups of Jochen Mueller and Caroline Gaus. During her time at RECETOX she will contribute to a RECETOX/NILU DA VINCI project looking at the interpretation of passive air sampling monitoring data. The aim of the joint project is to bring together and compare monitoring data from different regional and global monitoring networks in order to assess spatial and temporal trends, whilst understanding monitoring data limitations.



Our new colleagues, from the left: Eva Holt, Pernilla Carlsson and Petra Booij, RECETOX archive

New Papers Published

RECETOX continues to publish its research outcomes in prestigious peer-reviewed journals. Below is a selection of research papers published in 2015 so far:

Jonáš, A., Scholz, S., Fetter, E., Sychrová, E., Nováková, K., Ortmann, J., Beníšek, M., Adamovský, O., Giesy, J.P., Hilscherová, K. (2015) Endocrine, teratogenic and neurotoxic effects of cyanobacteria detected by cellular in vitro and zebrafish embryos assays. *Chemosphere* 120: 321-327. DOI: 10.1016/j.chemosphere.2014.07.074

Jarošová, B., Filip, J., Hilscherová, K., Tuček, J., Šimek, Z., Giesy, J.P., Zbořil, R., Bláha, L., Can zero-valent iron nanoparticles remove waterborne estrogens? *Journal of Environmental Management* 150 (2015) 387-392 (<http://dx.doi.org/10.1016/j.jenvman.2014.12.007>)

Zhang, N., Schindelka, J., Hartmuth, H., George, Ch., Rosell, M., Herrero-Martin, S., Klán, P., Richnow, H., Investigation of Humic Substance Photosensitized Reactions via Carbon and Hydrogen Isotope Fractionation. *Environmental science and technology* 2015 (233-242), dx.doi.org/10.1021/es502791f

Gielen, F., Buryska, T., Butz, M., van Vliet, L., Damborsky, J., Prokop, Z., Hollfelder, F., : Interfacing Microwells with Nanoliter Compartments: A Sampler Generating High-Resolution Concentration Gradients for Quantitative Biochemical Analyses in Droplets. *Anal. Chem.*, 2015, 87 (1), pp 624-632 DOI: 10.1021/ac503336g.

Kosior, G., Klánová, J., Kukučka, P., Vaňková, L., Chropeňová, M., Brudzińska-Kosior, A., Samecka-Cymerman, A., Kolon, K., Kempers, A.J.: *Pleurozium schreberi* as an ecological indicator of polybrominated diphenyl ethers (PBDEs) in a heavily industrialized urban area. *Ecological Indicators* (2015) 48, 492-497.

Short Announcements

We are happy to announce the birth of children in families of our young staff between November 2014 and March 2015. Congratulations to Soňa Smetanová on the birth of her son Antonín.



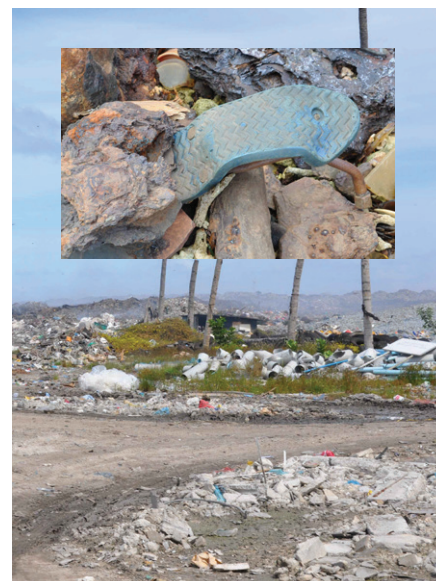
RECETOX Activities Abroad and in the CEE region

Workshop in Bratislava, Slovakia

The global workshop on updating national implementation plans (NIPs) under the Stockholm Convention was organized by the Secretariat of the Basel, Rotterdam and Stockholm Conventions in cooperation with the Basel Convention Regional Centre for Training and Technology Transfer for Central Europe in Bratislava, Slovakia on 17–19 February 2015. Professor Ivan Holoubek from RECETOX presented experience from updating the Czech Republic's NIP in 2012 to almost 50 participants from 20 countries worldwide.

Training in Seychelles

A workshop on sampling methods and monitoring techniques focused on persistent organic pollutants (POPs) and mercury took place in Victoria, Seychelles on 10–13 February 2015. This training was a part of the final workshop of the update of the National Implementation Plan and inventory of POPs in Seychelles. Professor Ivan Holoubek lectured for full four days to decision makers, national experts and other relevant stakeholders on principles of the national monitoring, on cost effective methods, and use of the results to build capacities in the country for a pilot sample collection in environmental matrices and in breast milk. The Stockholm Convention Regional Centre in RECETOX will support Seychelles in this activity for 12 months starting in April 2015. The aim of the sampling is to obtain information on national contaminated sites (usually landfills) as well as on the background levels of toxic compounds in ambient air and water of this small island state.



Workshop participants and images from the field trip to a landfill on the islands, RECETOX archive

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 Masaryk University, Brno, Czech Republic – provides comprehensive information on chemical contamination of the environment, namely persistent organic pollutants (POPs). The system combines expertise, validated data from partner institutions, and input from regular environmental monitoring programmes. Users and data providers get secure data repository, sophisticated analytical tools, and comfortable data management and visualization.



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

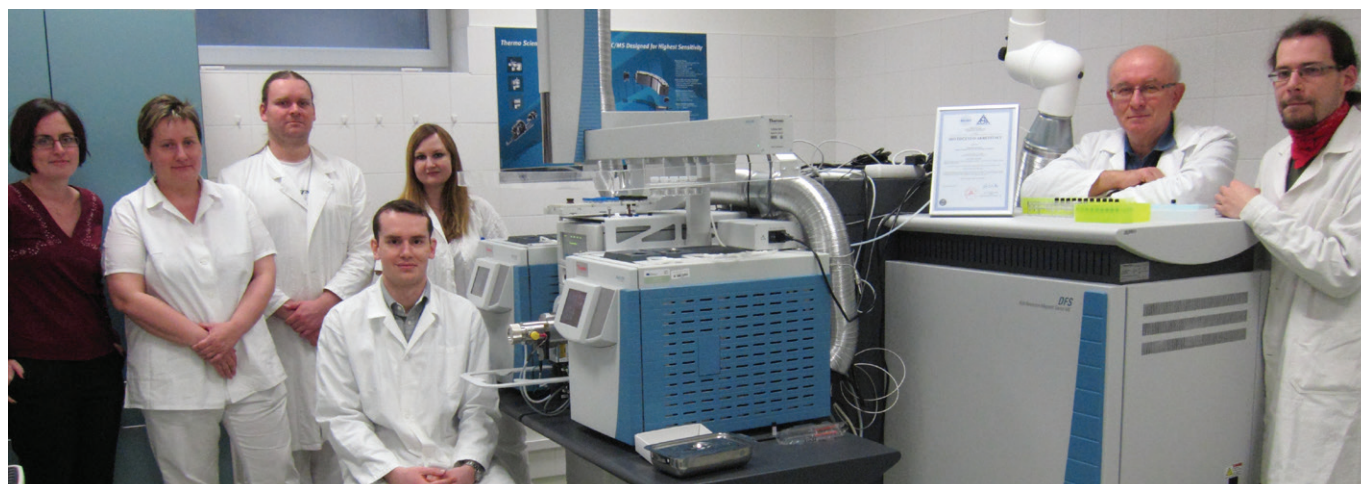
 – air, precipitation, soil, water, sediments, needles, mosses and lichens

- 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 Přibyllová (pribyllova@recetox.muni.cz) for more information.



New positions available at RECETOX

The RECETOX opens a call for several academic, non-academic and post-doc positions. We look for independent highly motivated researchers interested in interdisciplinary research with experience in environmental chemistry and/or analytical chemistry, human exposure and risk assessment, and environmental epidemiology and modeling. The deadline for submission of applications is 30 June 2015; the call may be prolonged until all positions are filled. More information is available on the RECETOX website www.recetox.muni.cz in the News section.

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