ContaSed2015

Contaminated Sediments:
Environmental Chemistry, Ecotoxicology and Engineering

8-13 March, 2015
Congressi Stefano Franscini, Monte Verità, Ascona, Switzerland

Program and Abstract Book

Conference Organizers and Speakers

Organizing Committee

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Invited Speakers

Flavio Anselmetti, University of Bern, Switzerland
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Marc Babut, IRSTEA, France
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Gerard Cornelissen, Norwegian Geotechnical Institute, Norway
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Derek Muir, Environment Canada, Canada
Martin Reinhard, National University, Singapore
Peter Santschi, Texas A&M University, USA
Anna Sobek, Stockholm University, Sweden
Jeroen Sonke, Geosciences Environment Toulouse, France

9.50 – 10.10 **Vesna Micic**
Bacterial wax esters in recent fluvial sediments as possible indicators of environmental stress

10.10 – 10.30 **Vladimir Beskoski**
Biotransformation of perfluorooctanoic acid by the action of microbial consortia isolated from sediment polluted with perfluorinated compounds

10.30 – 11.00 *Break*

Persistent Organic Pollutants — **Christian Bogdal**

11.00 – 11.30 **Anna Sobek (Keynote Lecture)**
POPs in Baltic Sea sediment: archive of the past and source for the future?

11.30 – 11.50 **Espen Eek**
Recent developments in methodologies for determining transport and chemical activity at the sediment-water interface

11.50 – 12.10 **Licia Guzzella**
Novel brominated flame retardant, PBDE and HBCD contamination in sediments and biota from Lake Maggiore (Northern Italy)

12.15 – 13.45 *Lunch*

13.45 – 15.45 **Posters**

15.50 – 16.10 **Saer Samanipour**
Pollutant distributions between sediments and the benthic water column in a deep lake: Application of passive sampling and GCxGC to less-studied and legacy halogenated contaminants in Lake Geneva

16.10 – 16.50 **Christian Bogdal**
Legacy and (re)emerging persistent organic pollutants in Swiss lake sediments

16.50 – 17.20 *Break*

Nanoparticles — **Bernhard Wehrli**

17.20 – 17.50 **Bart Koelmans (Keynote Lecture)**
Implications of nanoparticles and nanoplastics in aquatic ecosystems

17.50 – 18.20 **Lee Ferguson**
Today's status and future directions in the analysis of manufactured nanomaterials in the environment

Biotransformation of perfluorooctanoic acid by the action of microbial consortia isolated from sediment polluted with perfluorinated compounds

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Perfluoroalkyl and polyfluoroalkyl substances (PFASs) are manmade chemicals that can be found in the environment because of their wide use in chemical production since 1950s. Their unique properties such as surface activity, water and oil repellency, thermal and acid resistance made them popular for usage in many industrial processes such as in protective coatings for textiles, carpets, leather, food containers and wiring insulations for telecommunications (Zareitalabad et al., 2013).

The focus of this study was to confirm biotransformation of Perfluorooctanoic Acid (PFOA) by the action of microbial community isolated from locations known for long term pollution with PFOA. Microorganisms that inhabiting polluted environment are already naturally adapted to higher concentrations of pollutant chemicals. For some of those microorganisms we can expect that they can metabolize some particular pollutant. For example, the microbial community from PFOA-polluted site is expected to biotransform/biodegrade PFOA.

For the isolation of microbial consortia, sediment samples from Osaka Ajifu Waterway known for long term PFOA pollution were used. PFASs content in the sediment sample were (ng kg^{-1} dw): PFBA 390, PFPeA 1100, PFHxA 2300, PFHpA 1100, PFOA 9500, PFNA 1900, PFDA 2600, PFUnDA 1500, PFDoDA 16000, PFTrDA 4600, PFTeDA 18000, PFBS <200, PFHxS <200, PFOS <200, PFDS <200, respectively.

For enrichment and isolation of microbial consortia three different media were used: for total chemoorganoheterotrophs Nutrient Broth; for hydrocarbon degrading microorganisms Bushnell Haas broth amended with ***n***-heptane and for total yeast and molds Malt Extract broth were used. PFOA were added in all media, to stimulate growth of zymogenous microorganisms and to inhibit PFASs sensitive one.

Thermo Fisher Ultimate 3000 and Exactive LC/MS system was used in the untargeted analysis. Exactive was operated in negative-ion mode with a resolving power of 100,000. In all enrichments supplemented with PFOA, substances with negative mass defect were detected. It inferred that these ions had many fluorine atoms. Peak intensities of these compounds seemed to increase during the enrichment period suggesting relative increase in their concentration. Our study suggests that microbial community isolated from environment polluted with PFOA is a source of microorganisms who can conduct biotransformation of this emerging contaminant. However, further research is needed to confirm these data.

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Zareitalabad, P., et al., Chemosphere 91 (2013) 725-732.