

Experts exchange, NILU, Tromsø (Norway)

24th August – 20th September 2009

Experts exchange for 3 young scientists from ICT Prague was organised at the Norwegian Institute for Air Research (NILU), Tromsø, Norway with the aim to transfer knowledge about analytical methodologies applied for determination of perfluorinated compounds between both institutes.

The experts exchange at NILU started on August 24th, 2009, when two students from the ICT Prague, Jana Horakova – bachelor student and Petra Hradkova – PhD student, arrived to Tromsø, Norway. After one week Jana Horakova went away from Norway and another young scientist arrived – Kamila Kalachova, PhD student at ICT Prague.

During this stay they were accommodated at the students' house (**Photo 1**), 30 minutes away from the NILU (**Photo 2**). Dr. Dorte Herzke, member of NILU team participating in the EMERCON project who has acted as scientists' supervisor, worked with Petra and Jana during the whole time they have spent at NILU and were involved into the laboratory work at EMERCON activities.



Photo 1 - Student's dormitory



Photo 2 - NILU



The purpose of the experts exchange was transfer the information about sample preparation procedure and identification and quantification of ionic perfluorinated compounds (PFCs) using

specific instrumentation. Target matrices were fresh and canned fish. Analytical method developed by NILU for ionic PFCs was compared with that one used at ICT Prague. Furthermore, all sample tested for ionic PFCs were also examined by method developed for measurements of volatile PFCs.

Isolation procedures applied for determination of ionic PFCs in food samples are based on use of organic solvent (i) acetonitrile and (ii) methanol, at NILU and ICT Prague, respectively. Dispersive solid phase clean-up procedures using (i) EnviCarb and (ii) activated charcoal were used as the next steps of the analytical methods at NILU and ICT Prague, respectively. For separation of target analytes by a high performance liquid chromatography (HPLC) two analytical columns (i) ACE 3 RP C18 (150 mm × 2.1 mm; 3 µm) (ACE, UK) and (ii) Atlantis T3 (100 mm x 2.1 mm; 3 µm) (Waters, USA) were used. The identification/detection of target analytes was performed employing (i) Q-ToF Micro (Waters) in MS mode and (ii) Quattro Premier XE (Waters) tandem quadrupole mass spectrometer operated in MRM mode.

49 samples of fresh and canned fish samples were analysed altogether; all of them in two parallels. During the first week of the exchange five samples of canned fish (2 tunas, 1 sardine, 1 shell and 1 mackerel) and two vacuum packaged fish (salmon and herring) were purchased in local Tromsø markets. Other 35 samples originating from the Czech market were purchased in Prague and sent to Tromsø before the experts exchange started.

At the beginning of the whole procedure, all 49 samples were homogenized and stored in the fridge at 4°C until processing. Then all samples were treated by the sample preparation procedure for ionic PFCs (perfluorinated acids, sulfonates, sulfonamides, telomere surfactants) used by NILU. Next step was preparation of the samples for final determination of volatile PFCs (perfluorosulfonamidoethanols, sulfonamides) by analytical instrumentation. The first one were measured using liquid chromatography coupled to mass spectrometry (LC-MS), the second one were separated using gas chromatography coupled to mass spectrometry (GC-MS). The extraction procedure for volatile PFCs was based on the extraction with ethylacetate. Clean-up step was similar to that used for ionic PFCs. After content of target analytes in all the samples was examined by two NILU methods using different analytical instrumentation, young scientists initiated samples' preparation for analyses using the ICT Prague method for determination of ionic PFCs for the comparison. To assure accuracy of measurements the reference material and blank were analysed with each of defined batches of samples.

Last week of the stay in Tromsø Petra and Kamila purchased several species of fresh fish that were possible to buy at the local market. These species were the most consumed fish in this Norwegian area (the main species were cods (Pollock), salmon, ocean perch and *Anarhichas lupus*). All these fish were processed in the same way like other tested samples, both for ionic and volatile PFCs.

A first set of food related samples has been analysed at NILU and currently is quantified by both partners. The methods developed by both partners have been practically compared during the visit of the Czech young scientists in NILU. The results are going to be evaluated and will lead to potential subsequent method adaptations and a first assessment of possible knowledge gaps leading to possible refinement of the list of planned food samples to be analysed. Further method comparison can be performed and lead to a joint method optimised for the described monitoring activities in Norwegian – Czech food items.