

## Project information

### Project title

Polar pollutants and metabolites in Arctic biota samples - Hydrophilic pollutants and metabolites in Arctic biota samples

### Year

2013/2014

### Project leader

Dorte Herzke, NILU

### Participants

Project leader:

Dorte Herzke/ NILU (www. Nilu.no; [dhe@nilu.no](mailto:dhe@nilu.no))

Project participants/institutions:

- Geir Wing Gabrielsen, NPI
- Anita Evenset and Kjetil Sagerup, ApN

### Flagship

Hazardous substances, Theme: The impact of climate change on transport and fate of contaminants in the Arctic

### Funding Source

Fram Centre

### Summary of Results

After the cut in the proposed budget, 77 samples from Arctic biota were analysed by LC/MS/MS, in a targeted approach analyzing phenolic PCBs and PCP, but none of the mainland samples. The second measurement, a fullscan mode searching for unknown phenolic compounds has been carried out. The chromatograms were searched for new phenolic compounds. Phenolic candidates selected from recent literature, including Muir et al., were used for a tailored search of new phenolic compounds. None of the compounds could be found, applying the non-target approach mostly caused by limitations due the detection limit. For future projects, a different approach is suggested; using standard compounds representing candidate pollutants and measuring in a targeted way, by this reducing the limit of detection considerably (factor of 100).

In the first LC/MS experiments we found, that the applied LC/MSMS method only gave detected signals in the polar bear plasma samples, some in the seal and glaucous gull plasma and none in the egg samples for eider duck and kittiwake. Comparing with earlier reports, using GC/MS methods, a too poor sensitivity in the LC/MSMS approach was determined. Co-extraction of a set of seal plasma and applying the traditional technique of derivatisation followed by GC/MS showed a better sensitivity of 5 ng/ml so far.

Since we are dealing with already prepared sample extracts no further improvement of the sample treatment can be carried out within the frame of the project. The improvement the performance of the LC/MSMS is the only way to enable the detection of phenolic compounds in the respective extracts. Using a different ionization technique for the LC/MS/MS, the APCI instead of the ESI, did not increase the sensitivity of the method either. As a consequence, the optimization of the analytical sample preparation method is the next step in reaching low detection limits, suitable for the detection of phenolic compounds in Arctic samples.

### For the Management

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### Published Results/Planned Publications

No publishable data were achieved in the duration of the project. Since NILU will continue to work on the optimization of the applied methodology, we still expect to be able to carry out the planned measurements on the Arctic samples.

### Budget in accordance to results

Without the FRAM funding no further measurements of the samples would have been possible.

### Could results from the project be subject for any commercial utilization

No

### Conclusions

After a successful implementation of the new analytical methodology new samples can be analysed in a much faster way, resulting in the spending of less resources and manpower as well as new insights into the metabolic capability of a broad range of Arctic organisms

together with an evaluation of changes over time.