

Project information

Project title

Effects of organophosphorus flame retardants (PFRs) in benthic and pelagic Arctic fish species

Year

2013/2014

Project leader

Ingeborg Hallanger, UiT

Participants

- **Project leader:** Ingeborg G. Hallanger (UiT)
- **National participants:** Lisa B. Helgason (UiT), Karina Petersen (NIVA,), and Mikael Harju (NILU)
- **International participants:** Neel Aluru (WHOI, USA)

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

Preliminary summary: The project is still running, and has been delayed due to problems in implementing new methodology at the University of Tromsø. Due to these problems only one fish species (Atlantic cod) has been investigated even though four species (Atlantic cod, red fish, capelin, and Polar cod) were described in the Fram Centre application. Most of the issues with the methodology have been resolved and the *in vitro* exposure of liver to PFC's has been finished. Samples for oxidative stress and deep RNA sequencing has been sent from UiT to NIVA and WHOI respectively, and we are waiting their results.

Due to the difficulties with implementing the methodology at UiT **a comparison of two different liver sampling methods were carried out.** Two sampling methods in use today, that have been designed to provide a more accurate model of the liver for the use with *in vitro* (eco)toxicological studies, are the preparation of precision-cut liver slices and the use of cultured explants. Both of the methods use a whole liver piece, maintaining the structure of the liver tissue and containing all hepatic cell types in their natural composition. **Both *in vitro* tissue sampling methods assessed in this study have been shown to be equal in terms of viability and response to molecular methods and are therefore appropriate for the use in (eco)toxicological investigations, and to be compared.**

There is one main difference between the methods, which can be found in the ease of implementation, where the cultured explants have several advantages over the precision-cut slices, such as handling time where explants are more efficiently made in larger quanta than liver slices. Further explants need less liver material to make the same amount of replicates as liver slicing. This is of high importance in fish species with small livers. However, the reproducibility of similar pieces is greater in the liver slicing than in the explants, which ensures similarities between makings of samples but also between different people making the slices. Explants are more influenced by the person making the explant and differences in weight and size between days and persons can occur.

For the Management

Since this project has been delayed no results can be reported to management.

Published Results/Planned Publications

Published works:

Master Thesis: "A comparison of two sampling methods of hepatic tissue from Atlantic cod (*Gadus morhua*)"

Planned publications:

- Article:**
1. One publication from the master thesis on method comparison
 2. One publication from the oxidative stress and the RNA deep sequencing

Communicated Results

Due to the delay in the project no results have yet been communicated. However, when results are present these will be published in scientific journals and distributed through appropriate channels.

Interdisciplinary Cooperation

This project benefitted from cooperation with biologists and chemists. Mixing biology and chemistry in ecotoxicological studies enhance

the understanding and interpretations of the results that are to come.

Budget in accordance to results

The Fram centre founding made it possible to include national and international partners to this project. It also made it possible to widen the scope of endpoints that were studied during the project.

Could results from the project be subject for any commercial utilization

No

Conclusions

1. This is still to be known when we have all the results ready.
2. No new methods or techniques have been developed, however two methods have been compared and found to be equal in terms of viability and response to molecular methods and are therefore appropriate for the use in (eco)toxicological investigations, and to be compared between each other.