Project information

Project title

Temporal exposure and accumulation of Short Chained Chlorinated Paraffins (SCCPs) in Arctic seabirds

Year

2012/2013

Project leader

Nicholas Warner, NILU

Participants

- Leader: Nicholas A. Warner , NILU-Norwegian Institute for Air Research
- Participant: Anders Borgen, NILU-Norwegian Institute for Air Research
- Participant: Anita Evenset – Akvaplan-niva
- Participant: Geir Wing Gabrielsen – Nowegian Polar Institute (NPI)
- Participant: Thanh Wang – Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
- Participant: Katrine Borgå, NIVA-Norwegian Institute for Water Research

Flagship

Hazardous substances, Theme: Animal health and ecosystem

Funding Source

Fram Centre

Summary of Results

Despite exponential increase in SCCP production from China, no temporal trend of SCCP accumulation was observed between 2007 and 2009 in kittiwakes collected from the Svalbard Archipelago (see Figure). Although, SCCPs were detected in all samples, high blank concentrations (4.5 ng/g ww) rendered 80% of the samples below detection limits. Concentrations in samples above detection limits ranged from 5.8 -42 ng/g ww (97 – 716 ng/g lw). Concentrations ranged between found above detection limits were comparable to previous findings from kittiwakes collected in 2001 from Bjørnøya. SCCP concentrations found within kittiwakes were similar or lower compared to aquatic dwelling organisms (i.e., fish) from marine and freshwater systems within the same region, indicating effective elimination of SCCPs by kittiwakes. However, further studies should investigate the risk to aquatic dwelling organisms, as they may be more at risk to exposure and accumulation of SCCPs.

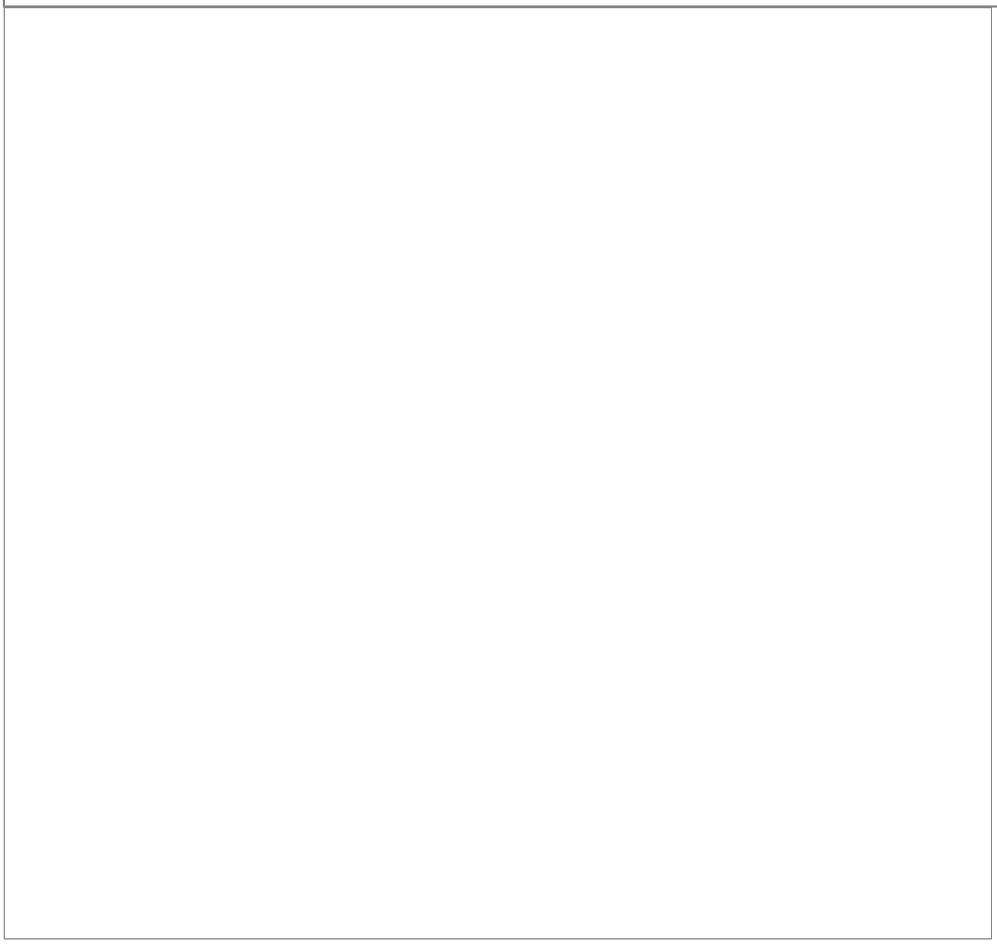

FIGURE 1: Short-chained chlorinated paraffins (SCCPs) concentrations (ng/g ww) in kittiwake muscle collected from 2007-2009 in Svalbard. Red dash line represent blank levels and dotted red lines represent standard deviation around blank level measurements.

Published Results/Planned Publications

This was a preliminary study to identify exposure risks to the Arctic environment. The results will not be published but will be used to plan future sampling campaigns to investigate organisms within the aquatic compartment.

Communicated Results

2012 Workshop on Chlorinated Paraffins : October 12, 2012. Kjeller, Norway, KLIF meeting, Environment section : A laboratory for environmental contamination – presented by Eldbjørg Hemistad (Miljøgifter Flaggskipp leder), October 22, 2012.

Interdisciplinary Cooperation

This project took advantage of the samples previously collected under the NFR funded COPOL (Contaminants in Polar Regions) project to investigate new contaminants in Arctic organisms. Biologists and eco-toxicologists from the COPOL project were invited to the 2012 Workshop on Chlorinated Paraffins to provide their expertise regarding Arctic environment and insight into the significance of these results.

Budget in accordance to results

Funding received by the Fram Centre was used to pay for the chemical analyses.

Could results from the project be subject for any commercial utilization

No

Conclusions

a) The results from this project indicate that exposure/accumulation risk of SCCPs to kittiwakes is low. However, recent research indicates that aquatic dwelling organisms (particularly in freshwater environments) may be at greater risk to exposure and accumulation of SCCPs. This is in agreement with earlier findings of SCCPs in fish from Arctic regions, which contained similar or higher concentrations compared to findings of SCCPs in kittiwakes from this study. Future plans will be make to investigate both marine and freshwater food webs within the Arctic to assess potential risks.

b) The results from this project indicate that improvements in analytical methodology are needed to reduced blank contamination introduced in order to assess SCCPs at trace environmental levels.