



Biomonitoring of dioxins/PCBs in a Dutch harbour city

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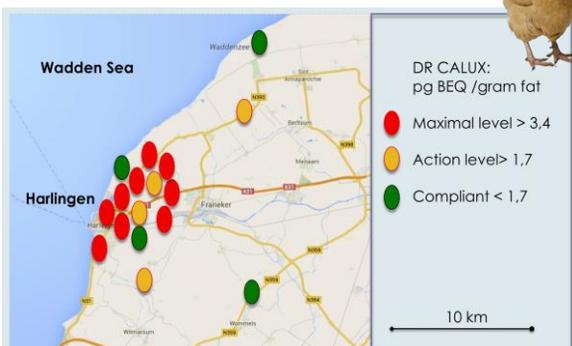
Introduction

In the Dutch harbour city Harlingen, people have recently been concerned about adverse health effects related to possible emissions of dioxins and other POPs by a recently installed waste incinerator. To evaluate these effects, the Toxicowatch foundation set up a pilot monitoring program with biomarkers of dioxin/PCB pollution in the environment of the city of Harlingen.

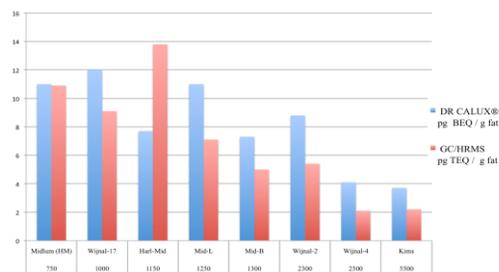
Methods and materials

All the matrixes, backyard eggs (18), liver of sheep and hares (6), milk of cow and goat (3), food (1), soil (3) and human blood (2) have been analysed for dioxins (PCDD/Fs) and dioxin-like polychlorinated biphenyls (dl-PCBs) by DR CALUX® (BDS). Eight locations with eggs of backyard chicken have been analysed by chemical GC/HRMS analysis.

Results



In this figure one can see the results of DR CALUX screening analyses of dioxins/dl-PCBs in eggs of backyard chickens in the environment of Harlingen.



The correlation between DR CALUX® and GC/HRMS proofed to be very satisfactory; there were no false positive or false negative results.

Reference

Besselink, H., Jonas, A., Pijnappels, M., Swinkels, A. and Brouwer, B. (2004). *Organohalogen Compounds*, 66: 677-681.

Matrix

Human Blood	Age	Distance Industry (Meters)	PCDD/Fs	dl-PCBs	PCDD/F/dl-PCBs	PCDD/F/dl-PCBs eggs	Egg-consumption per month
Hobby farmer 1	63	2200	88	20	108	1,7-8,8	40
Hobby farmer 2 (sportsman)	52	1170	7,4	4,2	7,4	13,8	10
Hare Liver							
♂	+/- 2 years	150	1,2	0,5	1,7 (suspect)		
♀	+/- 1 year	200	0,17	0,17	0,34 (suspect)		
♂	+/- 3 months	5400	1,8	0,6	2,4 (suspect)		

Blood serum samples from two male inhabitants of Harlingen City (which consumed several years such contaminated backyard chicken eggs) were taken. A hobbyfarmer, about 60 year of age, consuming more then 40 eggs a month (from chickens with a maximal age of 18 months) had elevated serum levels of dl-PCBs (PCDD/F: 22 pg BEQ/g fat, dl-PCB-BEQ: 88 pg BEQ/g fat) as analysed by DR CALUX.

Conclusions

This study shows that eggs of backyard chickens, livers of terrestrial animals and human blood are sensitive biomonitoring parameters for dioxin/PCB contamination in the vicinity of potential sources (harbour activity, waste incinerator, landfill). By using cost-efficient screening analysis tools (such as DR CALUX®) that are also affordable by private households, areas of public concern can be monitored in a rapid and efficient way. The correlation between DR CALUX® and GC/HRMS proofed to be very satisfactory; there were no false positive or false negative results. Our study indicates here one not yet known PCB-source and one not yet known dioxin-source. The fact that the levels of dioxins and dioxin-like PCBs are increasing with decreasing distance to the harbour urgently calls for closer investigation in order to find the sources of the dioxin/PCB pollution, and to prevent adverse health impacts for domestic animals, wildlife and human beings.

Acknowledgements

This project from the NGO Toxicowatch Foundation has been funded by citizens which are concerned about industrial pollution in their environment. The Toxicowatch Foundation want to stimulate inhabitants of areas of concern to privately investigate potential threats of their environment and public safety, in cooperation with industry and government.