


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	20	88	108	1,7-8,8	>40/ 20 years
Hobby farmer 2 (sportsman)	52	1170	7.4	< LOQ (4,2)	11.6	13,8	10/ 2 years
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)		

Figure 5: Analyses of human serum and here liver in the environment of Harlingen.

As result of these findings one year continuous sampling of the dioxin emissions in the flue gas of the incinerator will be performed including shutdown and start-up periods, in order to determine the source of the dioxin contamination of the environment. The program of analyses will be the 17 mandatory dioxin-congeners extended with measurements of dl-PCBs, PBDDs, PBDFs, PBBs, PBDEs, PFOS and PFOA. Addition of the brominated and fluorinated congeners can provide more data that can assist in determining the source. In parallel, an air quality-monitoring program will be started up for measurements of NO_x, SO₂, CO, PM₁₀, Cr, Cu, PB, Cd, Hg, C₆H₆, Toluene, Ethylbenzene, Xylene, HCl and HF.

Conclusions

This study showed eggs of backyard chicken to be sensitive biomarkers 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[®]), areas of public concern can be monitored in a rapid and efficient way. The correlation between DR CALUX[®] and GC/HRMS proved to be very satisfactory; there were no false positive or false negative results.

The results of this study point to at least two types of source of dioxin emission near Harlingen; a PCB and a PCDD source. Results show levels of dioxins and dioxin-like PCBs are increasing with decreasing distance to the harbour. In order to investigate the contribution of dioxins and dl-dioxins from the incinerator to the environment, continuous sampling of the dioxin emission in the flue gas of the incinerator, including the start-up and shut-down periods, will be necessary. Also an adequate air quality monitoring program need to be performed to prevent adverse health impacts for domestic animals, wildlife and human beings.

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References

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