LEVELS OF DIOXINS IN SOIL AND FRESHWATER FISH FROM NORTHERN NORWAY

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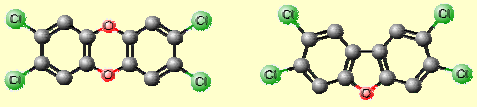
Background

•Levels of dioxins and furans in freshwater sediments from Lenvik municipality, Troms county, North Norway, indicated potential influence from local industrial sources.

•Two industries, metal production by FinnFjord A.S. and waste incineration by Senja avfallsverk are located in the same region as the freshwaters, see fig. 1.



Objectives

•Investigate levels and congener pattern of dioxins and furans in soil near the lakes and in freshwater fish, Arctic char (Salvelinus alpinus), brown trout (Salmo trutta) and perch (Perca fluviatilis), near potential industrial sources

•Increase the interest and knowledge of environmental science in schools by involving teachers and pupils in fish sampling.

Summary

•OCDD dominated the soil samples with values from 1.55 to 14.6 pg/g dry matter (dm).

•OCDD was also the most dominating one in freshwater sediment samples.

•HpCDD and OCDD had highest concentrations in the dust from the pipe filter

•Soil Sum PCDD/PCDF pg TE/g dm levels were lower than background levels from northern Canadian soils (0.2-0.9 pg TE/g dm).

•2378-TCDF highest concentration in 4 out of 5 fish samples.

•None of the fish samples exceeded the maximum level of 4 pg TE/g ww in fish muscle set by EU commission and Norwegian Food Safety Authority.

Conclusion

•Study reveals background levels of dioxins/furans in the soil samples nearby the lakes Botnvatn, Abborvatn and Finnfjordvatn.

•Fish from the lakes near Finnfjord a.s. and Senja avfallsverk are safe to eat.

Soil samples

Soil samples were collected September 2005 near the freshwater lakes Finnfjordvatn, Mevatn, Botnvatn and Abborvatn, see sampling sites in Fig. 1.

Pooled samples of 15 single soil samples from a square of 15 x 15 m, were used for analysis.

A filter bag containing dust was collected from the main pipe at Finnfjord a.s. for comparison with congener pattern in soil and fish samples.

Fish samples

Arctic char (Salvelinus alpinus), brown trout (Salmo trutta) and perch (Perca fluviatilis) were collected from the largest lake Finnfjordvatn, trout from Botnvatn and perch from Abborvatn, see fig.1

Pooled fillet samples of 5-10 fish were used for analysis.

Finnfjordbotn high school was involved in the sampling of fish and determination of fish length, fish weight, gender, maturity and age.

Lake	Fish species	Average age (yr)	Average weight (gram)	Average length (mm)	Comments
Finnfjordvatn	Perch (7)	5	538	330	Mature males/females
	Arctic char (16)	9,4	320	307	Mature pre-spawners, males
	Brown trout (10)	6,1	392	299	Immature males and females (50/50)
Botnvatn	Brown trout (14)	4,9	406	329	Males, mature pre-spawners/immature 50/50
Abborvatn	Perch (10)	7,1	115	209	Mature males/females

Sum Dioxins/Furans in soil samples, Troms county

Soil samples	Stations	Sum PCDD/PCDF pg TE (WHO)/g dm	% Ignition lost (IG)	Sum PCDD/PCDF pg TE (WHO)/g IG
Abborvatn	St. 1 & 2	0.06	0.48	12.5
Finnfjordvatn W	St. 5	0.09	0.98	9.2
Finnfjordvatn E	St. 6	0.18	0.41	43.9
Botnvatn W	St. 7	0.10	6.20	1.6
Botnvatn E	St. 8	0.16	10.1	1.6
Botnvatn NE	St. 9	0.10	1.90	5.3
Reference	St. 10	0.13	5.06	2.6
Finnfjord A.S.	Dust Pipe	6.80		

Sum Dioxins/Furans in fish samples from freshwater lakes, Troms County.

Fish samples	Sum PCDD/PCDF pg TE (WHO)/g ww	% Lipid content	Sum PCDD/PCDF pg TE (WHO)/g lw
Abborvatn Perch	0.12	0.42	28.6
Finnfjordvatn Char	0.14	1.63	8.6
Finnfjordvatn Trout	0.08	0.98	8.2
Finnfjordvatn Perch	0.10	0.57	17.5
Botnvatn Trout	0.24	1.06	22.6

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