

# PCDD/Fs, PCBs AND PBDEs IN FINNISH MOOSE (*ALCES ALCES*) LIVER

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## Introduction

Moose (*Alces alces*) is an important game animal in Finland. It feeds on leaves, wigs, bracken and grass, which is why it is a good indicator of the biota pollution. Of the 100 000 moose hunted each year in Finland about 2.5 kg moose meat is consumed per person each year. Marketing of liver of moose over one year is, however, not allowed because of accumulation of toxic heavy metals.

In this study PCDD/F, PCB and PBDE were analyzed in Finnish wild moose liver and compared with earlier Finnish monitoring studies with moose meat and reindeer meat and liver <sup>1,2</sup>.

## Materials and methods

Liver samples from adult moose and moose calves were sampled from Northern and Southern Finland (Fig. 1). Samples were pooled by sampling area, sex and age of the moose. After drying and extraction with Accelerated Solvent Extraction (ASE) the samples were purified and analyzed for PCDD/Fs, PCBs and PBDEs with GC-HRMS <sup>3</sup>.

Laboratory performing the analysis is an accredited testing laboratory T077 in Finland by FINAS. The scope of accreditation includes PCDD/Fs and PCBs in tissue samples.



Figure 1: Sampling areas

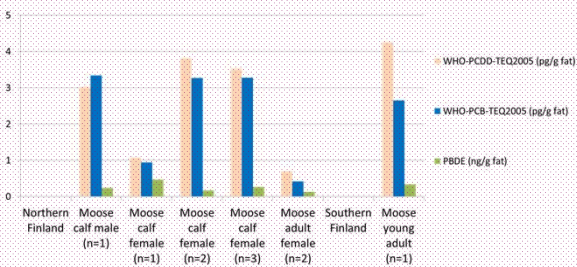


Figure 2: PCDD/F, PCB and PBDE concentrations in moose liver samples

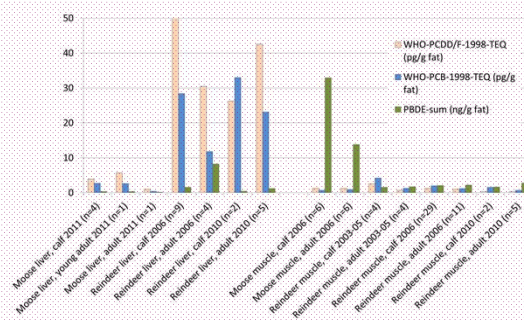


Figure 3: PCDD/Fs, PCBs and PBDEs in moose and reindeer meat and liver from earlier studies <sup>1,2</sup>

## Results and discussion

Results were calculated both as as lowerbound WHO-2005 TEQ (Fig. 2) and WHO-1998-TEQ (Fig. 3), and it was noticed that 1998 WHO-PCDD/F TEQs gave higher concentrations. 1998 WHO-PCBs were of the same magnitude as 2005 PCB-TEQs.

- One moose calf had clearly lower PCDD/F and PCB concentration in liver compared to other calves' livers.
- Moose adult from north had the lowest PCDD/F, PCB and PBDE concentration in liver, whereas a young individual from Southern Finland (n=1) had the highest PCDD/F liver concentration.
- Fat contents of moose liver were similar (on average 5.3%) and don't explain variation in contaminant levels.
- PCB concentrations in moose livers were quite equal to each other, apart from one moose calf liver sample from north and moose adult liver sample.

- PCDD/F and PCB concentrations in moose liver were notably lower than in reindeer liver (Figure 3), but higher than in moose and reindeer muscle. Differences between moose and reindeer tissue concentrations may result from differences in their nutrition or metabolism.
- PBDE concentrations in moose liver were lower than in reindeer liver or moose or reindeer muscle.

## References

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- Kiviranta H, Hallikainen A, Ruokojärvi P, Rantakokko P, Vartiainen T. *Organohalogen Compounds* 2006; 68:1898

