# Spatial Distribution and Accumulation of Brominated Flame Retardants in the European Eel in Flanders, Belgium

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The European eel (*Anguilla anguilla*) is an important species for commercial fisheries. There is, however, much concern over sharply declining numbers from about 1980 onwards [1]. The European eel is now on the IUCN Red List classified as a "critically endangered species" [2]. Since eels are benthic carnivores with a high fat content and long life span, they tend to accumulate higher amounts of persistent chemicals from water, food, and sediment than other species [3-5]. During the long spawning migration, sexual maturation occurs and they do not feed but rely instead entirely on their fat reserves. Thus chemicals that were incorporated into the fat can either be remobilized, causing potential problems to the eels during this important stage of sexual maturation, or are concentrated further in the remaining fat, much of which is later incorporated into the eggs. For a detailed review of effects of chemicals on eels see [6]. In this study, individual yellow eel samples (n=99), collected from various locations in Flanders (Belgium) in the period 1996–2009, were used to assess their pollution load. The aim of the present study was to investigate the levels, spatial distribution and profiles of polybrominated diphenyl ethers (PBDEs) and hexabromocyclododecanes (HBCDs) in wild yellow eels from the freshwater system of Flanders, Belgium.

The median value for total PBDEs for the 99 locations was 60 ng/g lw (lipid weight), ranging between 4.0 and 2850 ng/g lw. HBCD levels varied widely, ranging between 1.0 and 20860 ng/g lw, with a median value of 90 ng/g lw. The wide range of BFR levels reported in this study is likely due to the diversity of the sampling locations and sampling years, from highly industrialized areas to small rural creeks. Among PBDEs, BDE-47, -100 and -153 were the predominant congeners. The predominance of BDE-47 in the present study is consistent with the general pattern found in biota samples in other studies [5, 7], and is mainly due to the fact that BDE-47 is one of the major components of penta-BDE formulation which was used in many countries. For HBCDs, α-HBCD was predominant followed by γ- and β-HBCD isomers in almost all eel samples. The predominance of α-HBCD in fish of the present study is congruent with the scientific literature [5, 8], indicating its higher bioaccumulative potential. Comparisons between studies are likely to show large variations in BFR concentrations, as these depend largely on the sampling location and on the year of sampling, as levels tend to stabilise or decline due to regulatory measures [9]. Our data refers to a 'random' monitoring network. Due to the high spatial variability in contaminant levels, the contribution to the total human exposure through local wild eel consumption was highly variable.

The data shows an on-going exposure of Flemish eels to PBDEs and HBCDs through indirect release from sediments or direct releases from various industries. Therefore concerns are raised regarding the impact of these contaminants on eels and on the human exposure close to industrialized hotspots. This study showed the relevance of continued monitoring of PBDE and HBCD contamination in eels. Regarding the potential effects on the endangered eel, further research is needed to assess maternal transfer during reproduction, since the transfer of BFRs to offspring could be a critical element in the species' survival.

**References**

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