

Biomagnification of persistent organic pollutants in food webs from the Scheldt Estuary (Belgium)

Van Ael Evy¹, Adrian Covaci², Krishna Das³, Ronny Blust¹ and Lieven Bervoets¹

¹ Laboratory of Systemic Physiological and Ecotoxicological Research, Department of Biology, University of Antwerp, Groenenborgerlaan 171, 2020 Antwerp, Belgium
E-mail: Evy.VanAel@ua.ac.be

² Pharmaceutical Sciences, Toxicological Center, University of Antwerp, Universiteitsplein 1, 2610 Wilrijk, Belgium

³ Laboratory for Oceanology, MARE Centre, Liège University, 4000 Sart Tilman, Belgium

As persistent organic pollutants (POPs) are spread worldwide over various environmental compartments, they might also be bioavailable to organisms present in the same surroundings. Their chemical properties like stability, lipophilicity and persistence, give them the ability to easily accumulate into fatty tissues. When pollutants are not excreted or metabolized in the body, they can be passed on from prey to predator, resulting in elevated POP concentrations in species at higher trophic levels. As humans are also at the higher trophic levels, revealing details about bioaccumulation and biomagnification processes are of high importance for an accurate risk assessment about POPs in edible species.

In this study, POP concentrations in aquatic species collected from the Scheldt Estuary are linked with environmental concentrations and the trophic level of the species, to investigate which POPs are bioaccumulated from the environment into a certain species and which are even biomagnified through the estuarine food chain.

In June 2011, fish, crabs, mussels, shrimps, snails, worms, plants and sediments were collected from three locations (Terneuzen, Bath, Antwerpen) along the Scheldt Estuary by fike fishing, trawl fishing and by hand. In all the samples, concentrations of 33 PCB congeners, 7 PBDEs, DDXs, chlordanes, HCHs and HCB were measured with a gas chromatograph coupled with a mass spectrometer system (GC-MS). To determine the trophic position of the collected species, carbon and nitrogen stable isotope ratios ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) were measured using an isotopic ratio mass spectrometer (VG Optima, Isoprime, UK). By combining the stable isotope ratios with the pollution levels in several species, it is possible to identify biomagnification in a food web.