Assessment of human exposure to per- and polyfluorinated compounds (PFCs) through food, drinking water, house dust and indoor air

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Per- and polyfluorinated compounds (PFCs) are detected in humans worldwide but all sources of human exposure have not been fully characterized. Levels of PFCs, especially perfluorooctane sulfonate (PFOS), are present in blood from the general population at concentrations similar to the legacy persistent organic pollutants (POPs). The sources of exposure to PFCs are less well characterized even though these compounds are chemically persistent as the legacy POPs. This thesis aimed to evaluate the contributions from food, water, air and dust as sources for human PFC exposure in the general population.

Up to 27 PFCs were found at trace levels in blood (ng/mL), water (ng/L), foods (ng/g), dust (ng/g) and air (pg/m³) in a selected population. PFC concentrations in these exposure sources were combined with intake rates for food, drinking water, house dust and indoor air to estimate the intake from the respective source and their relative contribution to the total intake was calculated. The results revealed food as the dominating exposure pathway. However, maximum concentrations measured, representing a worst case scenario, resulted in a substantial contribution from drinking water for both adults and toddlers and equal contribution from house dust as from foods for toddlers. By pharmacokinetic (PK) modelling using serum concentrations of PFOS and perfluorooctanoic acid (PFOA), the estimated total intakes from exposure through food, drinking water and the indoor environment were confirmed, demonstrating that all major sources of exposure to PFCs for the general population were included in the study.