6.04P.5 Exposure of lettuce to perfluoroalkylated acids (PFAAs) in naturally contaminated soil: accumulation patterns and toxicokinetics

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Perfluoroalkylated acids (PFAAs) can enter the food chain due to their persistence, widespread use and global distribution. Field research has demonstrated that these substances can bioaccumulate and biomagnify in wildlife. Hence, it is very plausible that PFAAs can biomagnify to high concentrations in humans. For these reasons, PFAAs may pose a significant risk to human health as residents may inadvertently consume PFAA contaminated food. Over the last decade, the consumption of food products from self-cultivated origin by humans has become a remarkable trend in rural, urban and even industrial environments. For instance, growing edible crops in private gardens has gained popularity as plants constitute an important component of the human diet. At the same time, the dominant exposure source of PFAAs to humans is the diet. Due to the partial water solubility of PFAAs, water can be considered the main vehicle of transfer for PFAAs through the terrestrial food chain. Within this scenario, it has been demonstrated that some PFAAs accumulate to great extent in plants, from which they can be transferred to humans. However, little is known on the uptake rate of PFAAs in plants and the influence of different ontogenetic stages in this regard. Nevertheless, this is crucial information when considering the exposure risk of PFAAs through vegetables to humans. The main objective of this study was to assess the uptake rate of PFAAs in different (edible) parts of an edible crop species grown on a naturally PFAA contaminated soil. Secondly, we examined whether different ontogenetic types (primary versus secondary roots) and stages (young versus old leaves) of the plant were related with diverging uptake patterns. Preliminary results show that short-chain PFAAs bioaccumulate to relatively high concentrations in all plant parts. Kinetic modelling will reveal which PFAAs and to which extent they are taken up. For instance, PFOA accumulated to a greater extent and faster than PFOS in the leaf parts. Additionally, roots accumulated long-chain PFAAs to a greater extent than leaves. Total PFAA concentrations for all the detected compounds saturated over time, which has important implications regarding timing of harvesting crop plants in relation to potential human exposure to PFAAs.