

## Distribution of perfluorinated alkyl substances (PFAAs) in an aquatic food chain in the Vaal River, South Africa.

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Perfluorinated alkyl substances (PFAAs) are highly persistent chemicals, which have a bioaccumulative potential and can be found in wildlife around the world. Although multiple studies have been performed on PFAAs pollution of the aquatic environment, little is known on PFAAs pollution on the African continent and the possible risks for human health they pose. In the present study we examined the distribution of 15 PFAAs in fish, invertebrates, sediment and water, collected at three sites, representing a gradient, along the Vaal River, South Africa. Furthermore, possible risks for human health through consumption of contaminated fish was examined.

PFOS was the most dominant PFAA measured and was present in the highest levels in all abiotic and biotic samples. PFAAs levels in water ranged from below LOQ to 28 ng/L, decreased along the gradient and were either intermediate or lower compared to other studies in Europe, Asia and America. In sediment only one concentration of  $2.36 \pm 0.08$  ng/g dw showed good recoveries. Concentrations in biota increased along the gradient. PFAAs levels in invertebrates ranged from below LOQ to 34.39 ng/g dw and were low or intermediate compared to studies in Asia and America. PFAAs levels were higher in liver of fish than in muscle tissue and ranged from below LOQ to 340.2 ng/g ww in liver and below LOQ to 12.2 ng/g ww in muscle.

Assessment of the risk for human health through the consumption of PFAA-contaminated fish indicated no risk for humans. Maximum edible amounts of fish per day for a person of 70 kg (220 g/d for *Cyprinus carpio*) did not exceed the average South African fish consumption of approximately 20 g/d.

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