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Transfer of pahs by trophic way to eurasian perch *Perca fluviatilis* in controlled environment

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Introduction

Most health risks linked to fish consumption are based on the presence in edible tissues of pollutants, such as Polycyclic Aromatic Hydrocarbons (PAHs), some of them being known to be carcinogenic (Liang *et al.*, 2007). Therefore, our objective consists of studying the transfer of PAHs and metabolites levels, in muscle of Eurasian perch *Perca fluviatilis*, during low dose exposures by trophic way in a controlled environment.

Experimentation

After an acclimation period of three months, perch (N=75, mean weight 108 ± 16 g) were randomly distributed into three tanks (120 L, recirculated water; temperature at $19 \pm 1^\circ\text{C}$) using three modalities; a control group fed daily with pellets soaked up with acetone only and two experimental groups for which fish were fed daily with pellets, soaked up with acetone and a sub-lethal dose of a phenanthrene (PHE), pyrene (PYR) and benzo(a)pyrene (B(a)P) mixture. Experimental groups 1 and 2 received 10 and 100 μg of each PAH / kg of fish respectively. The experiment lasted 6 weeks. Three perch per group per week were killed. Muscles were frozen (-20°C) and lyophilized. PHE, PYR, B(a)P and their monohydroxylated metabolites (1, 2, 3 and 4-OH-PHE, 1-OH-PYR, 3-OH-B(a)P) were liquid-liquid extracted, SPE purified and also analyzed by HPLC-Fluorimetry.

Results

Fish already displayed concentrations of PYR (10 ng/g dw) and PHE (30 ng/g dw) at the beginning of the experimentation (before exposition). PYR and B(a)P were not accumulated in perch muscle during the 6 weeks whatever the doses. Besides, PHE concentration did not vary in the control group and the group 1. However, for the group 2, the level of PHE increased during 3 weeks (70.7 ng/g dw) and then levelled off (62 ng/g dw). For metabolites, 3-OH-B(a)P was not detected and 1-OH-PYR increased after 3 weeks (2ng/g dw), only for the group 2. The total of OH-PHE maintained to 8 ng/g dw for both control and group 1. For the fish of group 2, the total of OH-PHE increased after 4 weeks of exposure (18 ng/g dw). 1 and 2-OH-PHE were the most important even in the control group. On the other hand, 4 and 3-OH-PHE may be indicators of low PHE pollution, because they appeared only in contamination conditions.

Conclusion

Following a doping of pellets by PHE, PYR and B(a)P mixtures at 2 levels (10 and 100 µg of each PAH / kg of fish), both parent PAHs and metabolites transfers by the trophic way stayed low in perch muscle.

References

Liang Y., Tse M.F., Young L., Wong M.H., 2007. Distribution patterns of polycyclic aromatic hydrocarbons (PAHs) in the sediments and fish at Mai Po Marshes Nature Reserve, Hong Kong. *Water Research*, **41**, 1303-1311.