Interspecific biotransformation of micro-pollutants in fish from Swiss watercourses with different contamination levels

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The biotransformation of chemicals encompasses biological processes that are triggered in response to chemical exposure to support detoxification and the elimination of xenobiotics. Such processes are likely to vary among species due to factors related to gene conservation and inducibility. However, the influence of these factors towards differential sensitivity to exposure remains understudied. In addition, environmental and anthropogenic factors may alter biotransformation activity and the ability of species to cope with pollution. In the present study, fish species that are representatives of Swiss biodiversity were collected in watercourses with different levels of pollution and surrounded by different land use. Their livers were used to isolate S9 enzymatic fractions and comparative assessments were conducted to assess enzymatic activity and biotransformation rates of different micro-pollutants. Among species, brown trout (*Salmo trutta*) presented the highest activity for enzymes considered gold-standard biomarkers, including CYP1A and Glutathione-S-transferase, particularly in sites with high levels of anthropogenic influence. However, the pumpkinseed (*Lepomis gibbosus*), an invasive species from North America, presented significant activity of other biotransformation enzymes, like CYP3A4, and the highest biotransformation rates for micro-pollutants. Compared to brown trout and pumpkinseed, bottom-dwelling species, like the European bullhead (*Cottus gobio*) and the common barbel (*Barbus barbus*), displayed the lowest enzymatic activity and micro-pollutant biotransformation. These observations underline major species sensitivity differences towards pollution and highlight the influence of environmental and anthropogenic factors that could play a significant role in altering biodiversity in aquatic ecosystems.