Environ Toxicol. 2011 Jun;26(3):315-24. doi: 10.1002/tox.20559.

Biomarker analyses in caged and wild fish suggest exposure to pollutants in an urban area with a landfill.

Hanson N, Larsson Å.

Department of Plant and Environmental Sciences, University of Gothenburg, Box 461, 405 30 Gothenburg, Sweden. niklas.hanson@dpes.gu.se

Abstract

An unexpectedly high frequency of skeletal deformations in brown trout has previously been observed in the brook Vallkärrabäcken in southern Sweden. Environmental pollutants from storm water and leachate from an old landfill have been suggested as responsible for the observed deformations. Biomarkers in farmed rainbow trout, placed in tanks with water supplied from the brook, were used to investigate if exposure to pollutants may induce toxic responses in fish. Furthermore, biomarkers were also measured in wild brown trout that were caught in the brook. The most important finding was that the hepatic ethoxyresorufin-O-deethylase (EROD) activity was five to seven times higher for rainbow trout and brown trout in exposed areas compared to reference sites ($P<0.001$). Analyses of bile in rainbow trout showed that the concentration of PAH-metabolites was two to three times higher ($P<0.001$) in the exposed areas. However, due to their smaller size and the feeding status, only insufficient amounts of bile could be retrieved from the wild brown trout. The study provides evidence for pollution in parts of Vallkärrabäcken. It is therefore possible that the previously observed high frequency of skeletal damage have been caused by pollutants. The methodology with farmed rainbow trout in flow through tanks worked well and provided more information about the occurrence of pollutants in Vallkärrabäcken than the data from brown trout. The main reasons for this were that the size and the feeding status of the fish could be controlled. This allowed a total of 21 biomarkers to be analyzed in farmed rainbow trout compared to only five in wild brown trout. Furthermore, the use of farmed fish eliminates the risk of migration, which may otherwise bias the data when wild fish are used.

PMID:20052770[PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms, Substances

LinkOut - more resources