

DNA damage and biliary PAH metabolites in flatfish from Southern California bays and harbors and the Channel Islands

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ABSTRACT

Southern California bays and harbors have been shown to contain high concentrations of a variety of contaminants, including polycyclic aromatic hydrocarbons (PAHs), metals, and pesticides. Conventional monitoring tools do not assess exposure to PAHs in fish, or sublethal effects, which can be more sensitive indicators of stress than traditional methods. This study was conducted to evaluate DNA damage (a sublethal effect) and PAH exposure in flatfish from southern California bays and harbors, and the Channel Islands. California halibut (*Paralichthys californicus*) were collected from eight bays and harbors (Ventura Harbor, Channel Islands Harbor, Marina del Rey, King Harbor, Alamitos Bay, Long Beach Harbor, Newport Bay, San Diego Bay), and a reference site off Camp Pendleton. Pacific sanddab (*Citharichthys sordidus*) were collected near four of the Channel Islands (San Miguel Island, Santa Cruz Island, Anacapa Island, Santa Barbara Island). Metabolites of high molecular weight PAHs in fish bile were characterized using a semi-quantitative technique that measures fluorescent aromatic compounds (FACs) in fish bile. DNA damage in fish blood cells was assessed by measuring the amount of single-strand breaks in stained DNA using the Comet assay. The concentration of FACs in fish from all bays and harbors was elevated, with average concentrations ranging from three to ten times greater than FACs in reference fish. FAC levels were elevated in Pacific sanddabs from a Channel Islands station located between Santa Cruz Island and Anacapa Island. DNA damage varied by a factor of five among California halibut from bays and harbors, with significant damage occurring in fish from Alamitos Bay. There was a significant association between FAC concentrations and DNA damage in California halibut at Marina del Rey and Ventura Harbor, but not at other locations, presumably due to contaminants other than PAHs.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/JournalArticles/429_DNA_Damage_PAH_MetabolitesSoCal.pdf