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## Skipjack tuna as a bioindicator of contamination by perfluorinated compounds in the world's oceans

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Perfluorinated chemicals (PFCs) have emerged as global environmental contaminants. Earlier studies have reported the occurrence of PFCs in polar regions. Nevertheless, very few studies have reported distribution, concentrations, and profiles of PFCs in biota from offshore waters and open oceans. In this study, concentrations of 10 PFCs were determined in the livers of skipjack tuna ( $n=60$ ) (*Katsuwonus pelamis*) collected from offshore waters and open oceans around the Asia-Pacific region including the Sea of Japan, the East China Sea, the Indian Ocean, and the North Pacific Ocean during 1997-1999. Perfluorooctanesulfonate (PFOS) was the predominant compound ( $<1-58.9$  ng/g wet wt) found in the livers of tuna from offshore waters. Next to PFOS, several long-chain perfluorocarboxylates such as perfluorodecanoic acid (PFDA), perfluoroundecanoic acid (PFUnDA), and perfluorododecanoic acid (PFDoDA) were the major contaminants in tuna ( $<LOQ-31.6$  ng/g wet wt.). In several oceanic locations, concentrations of long-chain perfluorocarboxylates, particularly PFUnDA, were greater than the concentrations of PFOS. The profiles and concentrations of long-chain perfluorocarboxylates in tuna samples suggest a major common source of PFCs in the Asia-Pacific region. The spatial distribution of PFCs in skipjack tuna resembled the distribution in waters of the Pacific and Indian Oceans, suggesting that tuna are good bioindicators of oceanic pollution by PFCs. This study establishes baseline concentrations of PFCs in skipjack tuna from the oceans of the Asia-Pacific region to enable future temporal trend studies of PFCs in oceans.