

EPA PILOT STUDY OF PHARMACEUTICALS AND PERSONAL CARE PRODUCTS IN FISH TISSUE

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ABSTRACT

Obtaining environmental data on emerging contaminants is a priority area of interest for EPA, particularly the subset of emerging contaminants that includes pharmaceuticals and personal care products (PPCPs). Increasing evidence indicates widespread occurrence of PPCP compounds in surface water, sediments, and municipal effluent, but data on the accumulation of PPCP compounds in fish tissue are scarce. In response, the Office of Science and Technology within EPA's Office of Water initiated a pilot study to investigate the occurrence of PPCP chemicals in fish tissue called the EPA Pilot Study of Pharmaceuticals and Personal Care Products in Fish Tissue.

The targeted study design for this pilot involved collecting fish samples from five effluent-dominated streams in various parts of the country (Chicago, Illinois; West Chester, Pennsylvania; Orlando, Florida; Dallas, Texas; and Phoenix, Arizona) and from one reference site (Gila River, New Mexico). At each site, sampling teams collected 18 to 24 adult fish of the same resident species in the vicinity of wastewater treatment plant discharges. Field sampling was conducted from August through November 2006. Fish samples were divided into six composites, each containing three or four fish. All fish were frozen and shipped whole to an analytical laboratory at Baylor University. The laboratory analyzed fillet and liver tissue from the fish composites for 24 pharmaceutical compounds using a high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) method, and for 13 personal care products using a gas chromatography-tandem mass spectrometry (GC-MS/MS) method. The pharmaceutical compounds included analgesics, antibiotics, antidepressants, antihistamines, anti-hypertension drugs, and anti-seizure medications. Personal care product chemicals included fragrances/musks, surfactants, and ultraviolet filters. Seventeen of the 24 pharmaceutical compounds were not detected in any of the fillet or liver samples from the five sites located on effluent-dominated streams. The pharmaceuticals that occurred most frequently were diphenylhydramine, norfluoxetine (a fluoxetine metabolite), and sertraline.

KEYWORDS

fish tissue, pharmaceuticals, personal care products, emerging contaminants