Comparison of per- and polyfluoroalkyl substances (PFAS) mixture bioaccumulation in bluegill (*Lepomis macrochirus)* through water and dietary exposure

Rachel Leads, A. Deil Manliclic, Katie King, Koji Sano, Sima Kumar, Mehvish Mumtaz, Lori Ivan, John Newsted, Hui Li, A. Daniel Jones, Cheryl Murphy

Per- and polyfluoroalkyl substances (PFAS) are a large class of synthetic chemicals used in a wide range of industrial and commercial applications. These chemicals can enter the environment through wastewater treatment plant effluent, atmospheric deposition, landfills, biosolid application, and firefighting activities. Once in the environment, PFAS break down very slowly and can enter groundwater or bioaccumulate within the food web, leading to a variety of adverse health effects. Because of the numerous sources and applications of PFAS, these chemicals are present in the environment as complex mixtures of many different types of PFAS molecules. In aquatic ecosystems, PFAS accumulation in fishes can serve as an important route of dietary exposure to humans. Currently, knowledge of PFAS mixture exposure routes, accumulation, tissue distribution, and depuration in fishes is limited. To better understand these processes, the present study conducted a 56-day PFAS bioaccumulation and depuration experiment using young-of-the-year bluegill (*Lepomis macrochirus)*. During a 28-day uptake phase, bluegill were exposed to PFOS-only or a PFAS mixture (PFOS, PFOA, PFHxS) through water, diet, or water and diet. Following the 28-day uptake phase, fish were transferred to clean water and fed a clean diet for a 28-day depuration phase. Muscle, liver, and plasma samples were collected throughout the uptake and depuration phases to determine PFAS bioaccumulation rates, tissue distribution, and clearance rates. Mortality, hepatosomatic index, and gonadosomatic index were also recorded. Together, these data will provide important information about the uptake, tissue distribution, and depuration of PFAS mixtures in an ecologically and economically important fish species.