

CONTAMINATION BY BROMINATED FLAME RETARDANTS IN THE ASIA-PACIFIC REGION

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Concern over environmental contamination by brominated flame retardants (BFRs), especially by polybrominated diphenyl ethers (PBDEs) and hexabromocyclododecanes (HBCDs), has increased in recent years because of their persistence, bioaccumulative nature, and possible adverse effects on human and wildlife. Our study summarizes spatial and temporal trends of BFRs in eastern Asian waters using samples archived in the Environmental Specimen Bank (*es*-BANK) of Ehime University, Japan. In general, the results indicate that environmental levels of PBDEs and HBCDs have increased significantly during the last 30 years. In the samples from Japan, where usage of some commercial PBDE products was voluntarily discontinued in the 1990s, environmental PBDE levels seem to be in a steady state or slightly decreasing since then. However, in the same samples, concentrations of HBCDs exhibited continuous increasing trend and, in recent years, the contaminant levels appear to exceed those of PBDEs reflecting increasing usage of HBCDs over PBDEs in Japan. Increasing environmental contamination by PBDEs was also noticed in Chinese coastal waters; however, the levels of HBCDs in marine mammals from China were relatively low suggesting that demand for HBCDs, as an alternative for PBDE formulations has not yet increased in this region. Interestingly, striped dolphins in western North Pacific and Baikal seals from Lake Baikal, Russia showed constant increase of PBDEs during recent decades and drastic increase of HBCDs, suggesting continuous expansion of the BFR contamination on global terms. Success of environmental monitoring studies depends not only on advanced technology and human expertise, but also on systematic sample collection and storage, as substantiated and exemplified by the present study.