

ABSTRACT

Modelling the Bioaccumulation of Persistent Organic Pollutants in Fish Species

Ann Tenneil OConnor

A steady state food web bioaccumulation model was applied to the Kingston Harbour, Jamaica to assess the effects of feeding ecology and trophic structure on the bioaccumulation of persistent organic pollutants. The mean and standard deviations for total PCBs measured were 129 ± 69 , 289 ± 253 , 97 ± 72 , 56 , 427 ± 189 ng/g lipid for sea bream, sprat, jack, grunt and mysids respectively. The mean total PCBs measured in sediments was 27 ± 1 ng/g organic carbon. The sediment-water fugacity ratios calculated were less than 1 suggesting water as the more important source of contamination for the lower molecular weight congeners. Size related increases in PCB levels were observed in fish species for PCB 52 and PCB 153. Total PCBs were predicted within a factor of 0.5-5 by the model. Linear regression showed no significant association between measured and model predicted results. When the model bias was compared on a congener specific basis, highly chlorinated congeners were under-predicted. Following calibration and the application of a species adjustment factor, the model has good potential for use as a risk assessment tool.

Keywords: Ann Tenneil OConnor; Bioaccumulation model; POPs; fish species