

ENVIRONMENTAL TOXICOLOGY AND ECOLOGICAL RISK ASSESSMENT

October 19-20, 2017 | Atlanta, USA

Tissue distribution of HCH and DDT congeners in fish collected from Kabul River, Pakistan and human health risk associated with fish consumption

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Organochlorine pesticides (OCPs) such as hexachlorocyclohexanes (HCHs) and dichlorodiphenyltrichloroethane (DDTs) is one among the pollutants of global concern because of their environmental persistent potentiality toxic and bioaccumulative nature. In aquatic system, these pollutants load into fish either from water through gills or via gastrointestinal track from food ingestion and bioaccumulate in different tissues, and eventually transfer to human beings via fish consumption. Tissues distribution of HCH and DDT congeners in four different fish species from Kabul River, Pakistan, and their associated potential health risk to local consumer are presented. The average Σ (HCHs+DDTs) concentration in *Glyptothorax punjabensis* (214 ng g⁻¹) (carnivores) was found higher than *Tor putitora* (herbivores) (155 ng g⁻¹). The distribution of Σ (HCHs+DDTs) in all fish tissues was found in order of liver>muscle> stomach>gills (Fig. 1). The congeners profile indicated that all fish species were contaminated with recent usage of hexachlorocyclohexane (HCH) (β -HCH/ Σ HCH from 0.29-0.47), while dichlorodiphenyltrichloroethane (DDT) ((DDE+DDD)/ Σ DDT from 0.61-0.78) contamination originated from long -time degradation mechanism. The principal component analysis showed that the investigated compounds were metabolized in liver (e.g., DDT to DDE and DDD) after entering fish through gills, or transferred to stomach through diet (e.g., γ -HCH), and ultimately abundantly bioaccumulated in muscle mostly in the form of β -HCH, DDE and DDD. The average estimated daily dietary intake of Σ HCHs (15.0 ng kg⁻¹ day⁻¹) was found higher than Σ DDTs (12.5 ng kg⁻¹ day⁻¹) by the local consumer via fish consumption. Based on both 50th and 95th percentile exposure levels the carcinogenic hazard ratios for DDT and its congeners were exceeded unity for all fish species, indicating a great potential cancer risks for local consumer with life time.

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