Contamination by persistent organic pollutants in dumping sites of Asian developing countries: Implication of emerging pollution sources

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Abstract: In Asian developing countries, large amounts of municipal wastes are dumped daily in open dumping sites without proper management. This practice may cause several adverse environmental consequences and increased health risk to local communities. To elucidate contamination by persistent organic pollutants (POPs) - including dichloro-diphenyl-trichloroethane and its metabolites (DDTs), hexachlorocyclohexanes (HCHs), chlordanes, hexachlorobenzene (HCB), and polychlorinated biphenyls (PCBs) - in such dumping sites, soil samples were collected from open dumping sites and respective control sites in Cambodia, India, and Vietnam from 1999 through 2001. Our results demonstrated that DDTs, PCBs, and HCHs were dominant contaminants in the dumping sites. However, the contamination pattern was not consistent, showing higher HCHs in India than in Cambodia and Vietnam. Interestingly, in all of the countries, extremely higher levels of POPs were observed in the dumping sites compared with those in the respective control sites, suggesting significant amplification of POP contamination in the dumping sites of Asian developing countries. Mean concentrations of DDTs and PCBs were 350 and 140 ng/g dry weight, respectively, in the dumping sites of Cambodia and 26 and 210 ng/g, respectively, in India. These residue levels were hundreds to thousands times higher than those in general soils, implying possible risk to human health of the local communities, especially to the rag pickers, including children who work in these sites to collect recyclable materials. Composition of DDT compounds suggested their recent use in populated areas, which in turn might have caused increased levels of DDTs in the open dumping sites. In addition, composition of HCH isomers revealed their different use pattern in different countries. ?? 2006 Springer Science+Business Media, Inc.

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