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Contamination by Persistent Toxic Organochlorines in Tropical Asian and Oceánian Coastal Waters

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Summary

Persistent toxic organochlorines in air, water, sediment and fish samples were analyzed from eastern and southern Asia and Oceania to elucidate their geographical distribution in tropical marine environment and its global implication. Atmospheric and hydrospheric concentrations of HCHs (hexachlorocyclohexanes) and DDTs (DDT and its metabolites) in the tropical developing countries were apparently higher than those observed in the developed nations, suggesting extensive usage of these chemicals in the lower latitudes. CHLs (chlordane compounds) and PCBs (polychlorinated biphenyls) were also occasionally observed at higher levels in the tropics, implying that their usage area is also expanding southward.

Distribution patterns of organochlorines in sediment and fish samples showed smaller spatial variations on global terms, indicating that the chemicals released in the tropical environment are dispersed rapidly through air and water and retained less in sediments and aquatic organisms. The flux modelling in the tropical agroecosystem further illustrated that the insecticides budget to the coastal water bodies through water was less significant and its residence time in the aquatic environment was quite short, whereas transfer to the atmosphere was much larger in tropical areas.

All these findings concluded that low residue levels and shorter residence time of toxic contaminants in the tropical water bodies might be favourable from the viewpoint of environmental quality and animal health, while instead of contamination from tropical point-source areas, more accelerated pollution is probable on global terms through long-range atmospheric transport and may facilitate greater impacts on ecotoxicological concern.

The present study also detected butyltin compounds in fish samples from tropical Asia and Oceania, indicating the expansion of contamination by these chemicals over developing countries. However, butyltin residue levels in fish were lower than those from developed nations.