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Which persistent organic pollutants in the river Swat, Pakistan represent the greatest risk to the local ecosystem especially to fishes?

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Freshwater aquatic organisms can be exposed to hundreds of persistent organic pollutants (POPs) discharged through natural and anthropogenic activities. Given our limited resources, it is necessary to identify, from the existing evidence, which is the greatest threat so that control measures can be targeted wisely. The focus of this study was to rank POPs according to the relative risk they represent for the aquatic organisms in rivers in the Swat Region, Pakistan. A list of 13 POPs was compiled based on the available data regarding their presence in these rivers and ecotoxicological data. Those that were widely detected were benzo [a] pyrene, p,p'-DDE, p,p'-DDT, fluoranthene, heptachlor, hexabromocyclododecane, hexachlorobenzene, α -hexachlorocyclohexane, γ -hexachlorocyclohexane, naphthalene, perfluorooctanoic acid, perfluorooctane sulfonate and phenanthrene. Effect concentrations were compiled for Pakistani relevant and standard test species and compared with river aqueous concentrations. Only bed-sediment concentrations were available so that water levels could be calculated based on the known local sediment organic carbon concentration and the Koc. The POPs were ranked, based on the ratio between the median river and median effect concentrations. Of the POPs studied, fluoranthene was ranked as the highest threat, followed by phenanthrene, naphthalene and p,p'-DDE. The risk from p,p'-DDE may be magnified due to being highly bio-accumulative. However, the greatest overlap between river concentrations and effect levels was for lindane. Overall, fish was the most sensitive species group to the risks from POPs. Hotspots with the highest concentrations and hence risk were mainly associated with watercourses draining in Mingora, the biggest city in the Swat region.

Biography

Muhammad Ishaq is presently the Director of Science organization. He has completed his MS in Chemistry and Zoology from Research based Institute of Pakistan. He is the Member of National Academy of Young Scientists (NAYS), Pakistan. As a Chemist and Zoologist, he has shown active contribution in the field of science. He has participated in different workshops and seminars related to different fields. He has got a deep insight into Advanced Chemistry, Organic Chemistry, Inorganic Chemistry, Environmental Chemistry, Zoology and Experimental Statistics. Recently he has completed research on persistent organic pollutants in the river Swat "districts of Khyber Pakhtunkhwa, Pakistan". Furthermore he is very much interested to attend conferences and seminars on international level where he would create new ideas and discuss it with scientific communities to make it beneficial for the living organisms in near future.

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