Investigation of pesticide residues in water, sediments and fish samples from Tapi River, India as a case study and its forensic significance

Tanveer Alam Hashmi[1], Rizwana Qureshi[2], Devayani Tipre[2] & Shobhana Menon[3]

[1]Department of Forensic Science, Parul Institute of Applied Sciences, Parul University, Vadodara, Gujarat, India

[2]Department of Microbiology and Biotechnology, School of Sciences, Gujarat University, Ahmedabad, Gujarat, India

[3]Department of Forensic Science, School of Sciences, Gujarat University, Ahmedabad, Gujarat, India

Abstract:

This research is a case study on detection of pesticides in river water, sediment as well as fish samples from Tapi River, among the major rivers of Gujarat, India. To investigate the misuse, concentration level and occurrence patterns of persistent pesticides, samples were collected from the river. Chlorpyrifos, methyl parathion, hexachlorocyclohexane (HCH), dichloro diphenyl trichloroethane (DDT) and endosulfan were analyzed by gas chromatography technique with flame ionization detector (FID). Scanty reports are available, but after 1999, no such data are reported as some of these pesticides have been banned. Although these pesticides are still in use which we observed from the obtained results. In this river, the amount of endosulfan, chlorpyrifos, and methyl parathion was observed in surface water with concentrations of 37.56 µg/L, 0.86 µg/L and 0.43 µg/L, respectively. Endosulfan, DDT and methyl parathion detected in sediment were 38.38 ng/g, 0.65 ng/g and 0.77 ng/g, respectively. In fish samples, levels of endosulfan, chlorpyrifos, and methyl parathion detected were 101.28, 0.392, and 3.49 ng/g correspondingly. Results showed that highly toxic pesticides are still being used in the surrounding area, and there is an urgent need for enforcement of rules to control the production and application of such pesticides.