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Pesticide usage in vegetable, rice and cotton cropping area and its impact on surface water in three rivers

Statement of the Problem: Crop wise, in India the consumption of pesticides are found highest in cotton i.e., around 37%, followed by paddy 20%, while the vegetable consumes about 9% pesticide residues. The high water requirement and the heavy pesticide load used in crops in India have resulted in contamination of associated surface water such as streams, ditches, rivers and lakes. Farmers often spray hazardous insecticides like organophosphates and organochlorine up to five to six times in one cropping season while only two applications may be sufficient. The usual practice of draining crop water into irrigation canals may cause river and lake contamination. Therefore a study was undertaken to analyze the contamination by pesticide in surface water samples flowing near the farms of vegetable, rice and cotton growing areas.

Methodology & Theoretical Orientation: Samples of rivers (Yamuna, Hindon and Ghaggar) were taken from nearby field crop surface, 2 km, 2 km bottom and 5 km.

Findings: Yamuna River samples were found 45% contaminated with organochlorine and 25% with organophosphorous pesticides. All the synthetic pyrethroids analyzed were found below MRL value. Hindon River samples were found contaminated with 52% by organochlorine pesticides, 25% by organophosphorous pesticides and 12.5% by synthetic pyrethroids. Surface water samples collected from river Ghaggar were found contaminated with 38.6% organochlorine pesticide, 50% by organophosphorous pesticide and 10.5% by synthetic pyrethroids residues which were above MRL value.

Conclusion & Significance: The results are alarming and show that either the use of banned pesticides (DDT and Endosulfan) is still continued or they are present in surface water samples as they are very persistent. There is an urgent need of proper extension services to educate farmers about the judicious use of new molecules of pesticides along with integrated pest management approach to avoid contamination of water resources.

Biography

Tanu Jindal is a Professor and Director of Amity Institute of Environmental Science and also Amity Institute of Environmental Toxicology, Safety and Management and has 21 years of experience in Environmental Studies., Amity University, Uttar Pradesh, India. She has successfully completed projects from many prestigious funding agencies such as Ministry of Environment and Forest (MoEF), Ministry of Earth Sciences (MoES), Department of Science and Technology (DST). She has filed six patents on lysimetric-device, apparatus to estimate the loss of xenobiotics by volatilization and mineralization, natural pesticide, photochemical method to dispose of dilute pesticide waste, EMF radiation exposure system and cost effective water testing kit. Her recent initiatives are on environmental monitoring studies at Antarctica with NCAOR, Goa and GMO's of climate change resistant variance. She is a Visiting Professor to Derby University, UK. Her expertise is ISO-17025, GLP-studies, radio and stable isotope tracer techniques, GC, HPLC, ICP, MS and tissues exposures etc.

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