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Monitoring of widely used pesticides in surface water reservoirs and shallow wells in Walawe area

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Walawe area (WA) is a major agricultural area in Sri Lanka and a considerable amount of pesticides is used in the area. A farmer survey indicates that more than 95% of farmers use at least one pesticide to control pests in paddy. Cultivations of WA are irrigated by several surface water reservoirs. Some reservoirs which are fed by agricultural drainage are used as drinking water sources. Therefore, monitoring of water quality is an important requirement. In the study, residue levels of commonly used pesticides were monitored in 228 samples collected from surface water reservoirs and shallow groundwater during 2003 – 2006 in WA. Monitored pesticides and their method detection limits (as $\mu\text{g} / \text{L}$) are Methomyl (0.1), Imidacloprid (0.08), Carbaryl (0.04), Diuron (0.02), Fenobucarb (0.4), Carbosulfan (0.07), 2,4 D (0.2), MCPA (0.1), Dimethoate (0.03), Diazinon (0.006), Fenthion (0.007), Phenthoate (0.02), Propanil (0.01), Alachlor (0.02), Chlorpyrifos (0.005), Captan (0.07), Fipronil (0.004), Profenofos (0.03), Oxyfluorfen (0.006), Quinalphos (0.1), Carbofuran (0.1), 7-hydroxycarbofuran(0.1) and 3-ketocarbofuran(0.1).

Pesticide residues were not detected in Kattakaduwa Wewa (KW), Metigath Wewa (MW) and Pthirana Wewa(PW) which are fed by paddy cultivated catchments; Habaralu Wewa (HW) fed by sugar cane cultivated catchment; Kiri-ibban Wewa (KIW), Chandrika Wewa(CW) and Sooriya Wewa (SW) which are fed by mainly nonagricultural catchment. Pesticide residues were not detected in selected surface water reservoirs.

Applied pesticides of MCPA, Propanil, Diazinon, Carbofuran, Dimethoate, Chlorpyrifos, Oxyfluorfen, 2,4 D and Fenthion did not reach to shallow boundary wells, depth (0.4–3 m), water consumption (1-2 m^3), located 1 to 3 m distance from treated paddy fields.

Residues of Chlorpyrifos, Dimethoate, Propanil, MCPA and 2.4D were detected in Field samples but residue levels of these 5 pesticides were below detection levels at first dilution points within 100 m distance.

Even in KW and MW which are fed by agricultural drainage, no pesticide residues were detected in water under present pesticide application rates. Changes of pesticide load, distribution of application time of pesticides, photo degradation, chemical degradation, and microbial degradation may cause these low values. However, further studies are required to understand the behavior of pesticides in this environment.

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