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Pesticides Contamination Status of Ground and Surface Water in the Selected Head and Transitional Regions of the Kelani River Basin, Sri Lanka

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Abstract

Pesticides are useful to civilization because of their ability to eradicate or control insects, weeds and other pests. Most pesticides may be harmful for humans, animals and the environment because of their eco-toxicity, bio-accumulation and hormone disrupting effects. Pesticides usage in Sri Lanka gradually increased during the past decades and herbicides were recorded as the highest usage. Since the Kelani River basin is the most populated river basin in the country, a considerable percentage (60%) of the land covered with agricultural crops. Tea is the main crop in the central highlands and rubber is the most visible character within the basin. Scattered small patches of paddy cultivation area are also visible in head and transitional regions. The present study was focused on analyze of occurrence of pesticides in both ground and surface water in the head and transitional regions in the Kelani river basin. The study was focused on seven pesticide standards namely; Fipronil, Chlorothalonil, Profenofose, Oxyflurefen, Penthoate, Chlophyriphose and Diazinon. Twelve water sampling locations including ground and surface water selected to collect water from head and transitional regions to cover different land use practices. Quantification of pesticides were carried out using GCMS analysis. Out of twelve sampling points nine were positive for at least one pesticide was detected. The highest concentration of Profenofose (0.329 µg/L) and Oxyflurefen (0.246 µg/L) were recorded from Tientsin sampling location which was situated near by tea plantation and large scale vegetable farm. Diazinon (0.511 µg/L) and Chlorothalonil (0.030 µg/L) was high at Maththemagoda sampling point which situated near by a paddy cultivating area. The highest Chlophyriphose concentration (0.397 µg/L) was detected from Thoranakada location and it was situated close to the tea land. None of sampling locations were detected Fipronil and Penthoate pesticides. In the present study revealed clear relationship between pesticides and agricultural practices. Thus, the results of the study showed most of the pesticides applied in to the field can be detected in water as it is or as derivatives. Therefore, attention should be given to evaluate the contamination status of pesticides as majority of people use ground and surface water of the Kelani river basin as drinking water.

Keywords: Kelani river basin, Surface and ground water, Insecticides, Herbicides, Fungicides