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Sorption behaviour of pesticides in soils of Walawa basin

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Walawa basin is a high agricultural area, which has heavy growths of paddy, banana and numerous types of vegetables. Farmers in this area are used to apply high amounts of agrochemicals, especially pesticides, and pesticide application pattern is malpracticed. Walawa basin consists of a well-established irrigation system and evenly distributed water channel and cascade tank systems. The malpracticing of pesticides application would be the cause for pollution of ground and surface water resources. Therefore the study of sorption behaviour of pesticides in soils is highly necessary for better understanding of the problems and good environmental management. This study focused to calculate the pesticides soil sorption coefficient (K_d) for all types of soils in Walawa basin for two pesticides namely, carbofuran and diuron.

Surface soil samples (0 - 10 cm) from fourteen soil series in Embilipitiya area were collected. Air-dried samples were sieved (2mm) and soil characters such as pH, electrical conductivity, total organic carbon and soil texture were determined. Each soil was mixed with pesticide solutions with a ratio of 5g of soil : 1ppm solution, shaken under room temperature for 16 hours, centrifuged and the supernatant was analysed using HPLC 18 c Apollo column. K_d value (partition co-efficient of organic compound between water and soil) for each soil series was calculated.

The sorption of diuron exhibited higher values (0.5 to 75) for all soil types than carbofuran (0.11 to 4.1). Kachichigalara had the highest adsorption of carbofuran and it can be related to its highest amount of total organic carbon. Although Walawe soil series has the lowest organic carbon content it did not show the lowest adsorption rate. Morakatiya and Kachechigalara had the highest and thimbolketiya and Kirimatiya had the lowest calculated K_{oc} values for diuron and carbofuran, respectively.

The results show that not only organic carbon content but also some other factors such as, clay content and pH are also responsible for the sorption behaviour of pesticides in soils.

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