

AN INVESTIGATION OF GROUNDWATER CONTAMINATION WITH CHLORPYRIFOS IN INTENSIVELY CULTIVATED REGOSOLS OF THE KALPITIYA PENINSULA

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Leaching of agro-chemicals resulting in groundwater pollution is a potential threat in the Kalpitiya Peninsula, where intensive agriculture is being practised in sandy soils with frequent irrigation and heavy application of fertilisers and pesticides. A majority of people in the Kalpitiya peninsula obtains their portable water from wells. Some irrigation wells are used for portable water supplies, which are recharged by return irrigation flows. At present, no systematic monitoring of groundwater is being performed in the area. This study was conducted to investigate the potential contamination of groundwater with chlorpyrifos, using lysimeters, in an intensively cultivated field in the Kalpitiya Peninsula, and to assess the level of contamination of well water around the area.

Two lysimeters were installed in the field prior to cultivation. After application of chlorpyrifos, the field was continuously irrigated, and water samples from lysimeters were collected periodically for 24 hours. In addition, well water in and around the field was collected and analysed for pesticide residues. Water samples were taken before and 30 hours after application of chlorpyrifos from one well situated within the experimental field. All samples were analysed for chlorpyrifos using gas chromatography with a flame ionization detector (FID).

Results revealed high concentration of chlorpyrifos in water drained from the lysimeters, exceeding the WHO drinking water standards. In addition, analysis of well water samples indicated contamination with pesticides, particularly in intensively cultivated areas. Along with chlorpyrifos, unknown pesticides residues were observed in well water. Chlorpyrifos was not detected in the well situated within the field before application of the chemical, but high levels were observed 30 hours after application. The results indicate a potential high risk of groundwater contamination with chlorpyrifos in sandy regosols under intensive cultivation.