

Pesticide Distribution and Evolution in Prek System in Koh Thum, Kandal Province

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One of Southeast Asia's emerging Cambodia, known as the agricultural country where approximately 80% of Cambodians live in rural areas, and 65% of them depend on agriculture for a living. More than 3.2 million liters of pesticides, containing more than 100 different types of compounds, are used in agriculture in Cambodia every year. Farmers frequently apply pesticides in violation of the instructions on the label of the pesticide box, including using them at the incorrect time, in the incorrect concentration, and in an improper way. With the agriculture intensification in developing countries, the quantities of pesticide used in Cambodia is seriously growing with potential consequences for the environment. This research aims to screen (database 451 compounds) the presence of pesticides in water and quantify the concentration of 27 targeted compounds in a developing irrigated system in the Cambodia upper Mekong delta (Koh Thum district, Kandal province). Solid-phase extraction (SPE) and gas chromatography-mass spectrometry (GC-MS) methods were used to purify and analyse the samples, respectively, which were collected at 6 different locations in both dry and wet seasons. The results showed that among the MS database, 6 compounds were found through semi-quantitative analysis, namely fluquinconazole, hexaconazole, pretilachlor, paclobutrazol, propiconazole, and azoxystrobin. However, among the 27 targeted pesticide compounds, none of them were detected. The majority of biocides were fungicide (5 compounds). Among the 6 pesticide compounds detected, none of them were extremely hazardous while 2 compounds were moderately hazardous (paclobutrazol and propiconazole), 1 slightly hazardous (hexaconazole), 1 unlikely to present acute hazard (azoxystrobin), and 1 compound (fluquinconazole) was not mentioned in the list of toxicity. In addition, 2 highly persistent pesticides (hexaconazole and paclobutrazol) were found, meanwhile 2 lowly persistent pesticides (fluquinconazole and propiconazole), 1 moderately persistent pesticide (azoxystrobin), and 1 pesticide of unknown persistence (pretilachlor) were detected. The chemical family group was mostly found as triazole. Further analyses should be extended to a bigger scale and be continued monitoring.

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ABSTRACT: One of Southeast Asia's emerging Cambodia, known as the agricultural country where approximately 80% of Cambodians live in rural areas, and 65% of them depend on agriculture for a living. More than 3.2 million liters of pesticides, containing more than 100 different types of compounds, are used in agriculture in Cambodia every year. Farmers frequently apply pesticides in violation of the instructions on the label of the pesticide box, including using them at the incorrect time, in the incorrect concentration, and in an improper way. With the agriculture intensification in developing countries, the quantities of pesticide used in Cambodia is seriously growing with potential consequences for the environment. This research aims to screen (database 451 compounds) the presence of pesticides in water and quantify the concentration of 27 targeted compounds in a developing irrigated system in the Cambodia upper Mekong delta (Koh Thum district, Kandal province). Solid-phase extraction (SPE) and gas chromatography-mass spectrometry (GC-MS) methods were used to purify and analyse the samples, respectively, which were collected at 6 different locations in both dry and wet seasons. The results showed that among the MS database, 6 compounds were found through semi-quantitative analysis, namely fluquinconazole, hexaconazole, pretilachlor, paclobutrazol, propiconazole, and azoxystrobin. However, among the 27 targeted pesticide compounds, none of them were detected. The majority of biocides were fungicide (5 compounds). Among the 6 pesticide compounds detected, none of them were extremely hazardous while 2 compounds were moderately hazardous (paclobutrazol and propiconazole), 1 slightly hazardous (hexaconazole), 1 unlikely to present acute hazard (azoxystrobin), and 1 compound (fluquinconazole) was not mentioned in the list of toxicity. In addition, 2 highly persistent pesticides (hexaconazole and paclobutrazol) were found, meanwhile 2 lowly persistent pesticides (fluquinconazole and propiconazole), 1 moderately persistent pesticide (azoxystrobin), and 1 pesticide of unknown persistence (pretilachlor) were detected. The chemical family group was mostly found as triazole. Further analyses should be extended to a bigger scale and be continued monitoring.

Keywords: GC-MS, Pesticides, Prek System, SPE, Toxicity