Abstract

There is no information on spatial distribution, monitoring and risk assessment of currently-used pesticides (CUPs) of the Uchalli Wetland Complex (UWC). To address this data gap quantitatively eight CUPs (Chlorpyrifos, Diazinon, Azinphos, Carbofuran, Fipronil, Malathion, Aldicarb and Deltamethrin) were reported for the first time in water, air, agricultural soil, and sediment samples collected in 2022 from Uchalli and Khabeki Lake including the area of agricultural setting in the vicinity of these Lakes. Chlorpyrifos was the most abundant pesticide in sediments and air of Uchalli and Khabeki Lake moreover, Carbofuran was the most prevalent pesticide in water samples of both Lakes. Furthermore, Fipronil and Chlorpyrifos were the most abundant pesticides in soil of Uchalli and Khabeki Lake respectively. Health risk, ecological risk, and EIQ assessment (novel assessment model) were used to highlight pesticides of major concern that should be thoroughly monitored to avoid adverse effects. Results of this study show that Chlorpyrifos is the most toxic pesticide to be used in agricultural land of UWC with values EIQ field use rating = 482.22, RQ > 10, HQ > 1 and the farmers are not aware of the risks associated with pesticides when working with these substances. Concentration levels of all studied pesticides were higher in water samples of Uchalli Lake than in Khabeki Lake. Specialized stewardship for pesticide application training and advisory services are required for farmers of UWC. Producers and practitioners of integrated pest management (IPM) can take environmental effects into account when choosing required pesticide in addition to pesticide effectiveness and cost. EIQ field use ratings should be lowered or brought close to zero for agricultural production systems that are ecologically benign or neutral.