

Organophosphorus pesticide multiresidues in commercialized Asian rice

ABSTRACT

The organophosphorus pesticides (OPPs) commonly used in agricultural practices can pose a risk of potential exposure to humans via food consumption. We describe an analytical method for solid-phase extraction coupled with high-performance liquid chromatography–diode array detector (SPE–HPLC–DAD) for the detection of OPPs (quinalphos, diazinon, and chlorpyrifos) in rice grains. The isolation of targeted residues was initiated with double extraction before SPE–HPLC–DAD, crucially reducing matrix interferences and detecting a wide range of multiple residues in rice grains. Coefficients of 0.9968 to 0.9991 showed a strong linearity, with limits of detection and quantification ranging from 0.36 to 0.68 $\mu\text{g}/\text{kg}$ and from 1.20 to 2.28 $\mu\text{g}/\text{kg}$, respectively. High recoveries (80.4–110.3%) were observed at 3 spiking levels (50, 100, and 200 $\mu\text{g}/\text{kg}$), indicating good accuracy. The relative standard deviations of all residues (0.19–8.66%) validated the method precision. Sample analysis of 10 rice grain types ($n=30$) available in the Asian market revealed that quinalphos, diazinon, and chlorpyrifos at concentrations of 1.08, 1.11, and 1.79 $\mu\text{g}/\text{kg}$, respectively, remained far below the maximum residue limits (0.01–0.5 mg/kg). However, regular monitoring is necessary to confirm that multiresidue occurrence remains below permissible limits while controlling pests. *Environ Toxicol Chem* 2020;39:1908–1917.