Residue Analysis of Organophosphorus and Organochlorine Pesticides in Fatty Matrices by Gas Chromatography Coupled with Electron-Capture Detection

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A multiresidue method for the simultaneous determination of 22 organochlorine (OCs) and organophosphorus (Ops) pesticides (including isomers and metabolites), representing a wide range of physicochemical properties, was developed in fatty matrices extracted from meat. Pesticides were extracted from samples with acetonitrile/*n*-hexane (v:v, 1:1). The analytical screening was performed by gas chromatography coupled with electron-capture detection (ECD). The identification of compounds was based on their retention time and on comparison of the primary and secondary ions. The optimized method was validated by determining accuracy (recovery percentages), precision (repeatability and reproducibility), and sensitivity (detection and quantitation limits) from analyses of samples fortified at 38 to 300 ng/g levels. Correlation coefficients for the 22 extracted pesticide standard curves (linear regression analysis, $n = 3$) ranged from 0.998 to 1.000. Recovery studies from 2 g samples fortified at 3 levels demonstrated that the GC-ECD method provides 64.4–96.0% recovery for all pesticides except 2,4′-DDE (44.6–50.4%), 4,4′-DDE (51.1–57.5%) and 2,4′-DDT (50.0–51.2%). Both repeatability and reproducibility relative standard deviation values were $< 20\%$ for all residues. Detection limits ranged from 0.31 to 1.27 ng/g and quantification limits were between 1.04 and 4.25 ng/g. The proposed analytical method may be used as a simple procedure in routine determinations of OCs and Ops in meat. It can also be applied to the determination of pesticide multi-residues in other animal products such as butter and milk.

Key words: Pesticides, Multiresidues, Fatty Matrices