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| Title | Analysis of DDT and its metabolites in soil and water samples obtained in the vicinity of a closed-down factory in Bangladesh using various extraction methods | | |
| Author(s) Name | MNU Al Mahmud, Farzana Khalil, Md Rahman, MIR Mamun, Mohammad Shoeb, Abd El-Aty AM, Jong-Hyouk Park, Ho-Chul Shin, Nilufar Nahar, Jae-Han Shim | | |
| Contact Email(s) | nilufarnahar@yahoo.com | | |
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| Abstract |  |
| This study was conducted to monitor the spread of dichlorodiphenyltrichloroethane (DDT) and its metabolites (dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD)) in soil and water to regions surrounding a closed DDT factory in Bangladesh. This fulfillment was accomplished using inter-method and inter-laboratory validation studies. DDTs (DDT and its metabolites) from soil samples were extracted using microwave-assisted extraction (MAE), supercritical fluid extraction (SFE), and solvent extraction (SE). Inter-laboratory calibration was assessed by SE, and all methods were validated by intra- and inter-day accuracy (expressed as recovery %) and precision (expressed as relative standard deviation (RSD)) in the same laboratory, at three fortified concentrations (n = 4). DDTs extracted from water samples by liquid-liquid partitioning and all samples were analyzed by gas chromatography (GC)-electron capture detector (ECD) and confirmed by GC/mass spectrometry (GC/MS). Linearities expressed as determination coefficients (R 2) were ≥0.995 for matrix-matched calibrations. The recovery rate was in the range of 72–120 and 83–110 %, with <15 % RSD in soil and water, respectively. The limit of quantification (LOQ) was 0.0165 mg kg−1 in soil and 0.132 μg L−1 in water. Greater quantities of DDTs were extracted from soil using the MAE and SE techniques than with the SFE method. Higher amounts of DDTs were discovered in the southern (2.2–936 × 102 mg kg−1) or southwestern (86.3–2067 × 102 mg kg−1) direction from the factory than in the eastern direction (1.0–48.6 × 102 mg kg−1). An exception was the soil sample collected 50 ft (15.24 m) east (2904 × 102 mg kg−1) of the factory. The spread of DDTs in the water bodies (0.59–3.01 μg L−1) was approximately equal in all directions. We concluded that DDTs might have been dumped randomly around the warehouse after the closing of the factory. | |