

Multiclass pesticide residue analysis in fruit and vegetable samples by combining acetone-based salting out assisted extraction with dispersive liquid–liquid microextraction

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Abstract

Isolation and enrichment of multiclass pesticides residue; viz, fungicides (benalaxyl), herbicides (atrazine), carbamate insecticides (carbofuran), organophosphate insecticides (chlorpyrifos), organochloro insecticides (4, 4'-DDT) and pyrethroid insecticides (bifenthrin), was made by combining acetone-based salting out assisted extraction with dispersive liquid–liquid microextraction (SADLLME) method, followed by high performance liquid chromatography-diode array detection (HPLC-DAD). The effect of the type and volume of extraction solvent in the pretreatment step, and the volume of disperser solvent (acetone extract), the type and volume of extraction solvent, pH and salt addition in the DLLME procedure were studied. Good coefficient of determination ($R^2 \geq 0.9964$) was obtained for all the target analytes. The limits of detection and quantification limits were between 2.1–4.5 and 5.7–12.9 $\mu\text{g}/\text{kg}$, respectively, with adequate enrichment factors ranging from 37.6–191. The recoveries of the spiked blank tomato ranged from 86.8 to 109.5%. Limit of quantification of the proposed method lower than the maximum residue limits set by the European Union. The repeatability and reproducibility of precisions ranged between 2.9–8.0 and 4.9–9.5%, respectively. The optimized and validated method was applied to quantify pesticides in tomato, pear, apple and melon obtained from different markets. However, all target compounds studied in this work were not detected in any real samples that applied. Overall, the work results revealed that the proposed method is useful for sample extraction and preconcentration of the target analytes from fruits and vegetables.

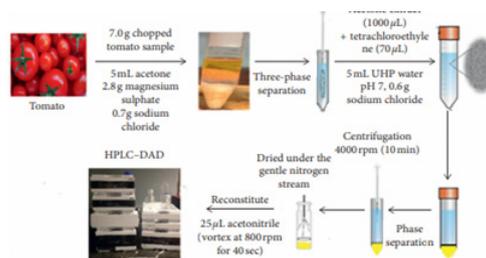


Figure 1: Schematic representation of the proposed acetone-based salting-out assisted extraction followed by the DLLME procedure

Biography

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