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Development of a Dispersive Micro-Liquid Liquid Method for the Extraction of Pyrethroid Pesticides from Environmental Matrices for Determination by Reversed-Phase High Performance Liquid Chromatography

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The conventional multiresidue methods involve the consumption of large quantities of toxic organic solvents which necessitate further clean up steps before analysis. In addition, the use of large amounts of toxic solvents for sample preparation is not eco-friendly and difficult to justify. Miniaturization can serve well in this regard and is currently a major trend in analytical chemistry. In the present work we developed a method for the rapid trace analysis of residual pyrethroid pesticides in agricultural waters by high performance liquid chromatography with diode array detection using dispersive liquid-liquid microextraction (DLLME). To the best of authors' knowledge, this is the first application of DLLME for the extraction of pyrethroid pesticides from aqueous matrices. Several parameters of the extraction procedure such as type and volume of extraction solvent, type and volume of dispersive solvent and salt addition were evaluated to achieve the highest yield and to attain the lowest detection limits. The DLLME procedure optimized consists in the formation of a cloudy solution promoted by the fast addition to the sample (5 ml) of a mixture of carbon tetrachloride (extraction solvent, 55 μ L) and acetone (dispersive solvent, 500 μ L). The tiny droplets formed and dispersed among the aqueous sample solution are further joined and sedimented (25 μ L) in the bottom of the conical test tube by centrifugation. Once extracted, the pesticides were directly injected and separated by RP-HPLC comprising a short column (Hiber- purospher star RP-18 end capped column (150 x 4.6 mm I.D., 5 μ m particle size) and a PDA detector.