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Development of a new sample preparation method based on liquid–liquid–liquid extraction combined with dispersive liquid–liquid microextraction and its application on unfiltered samples containing high content of solids

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ABSTRACT

A new sample preparation method based on liquid–liquid–liquid extraction combined with dispersive liquid–liquid microextraction followed by gas chromatography–flame ionization detection has been reported for the extraction/preconcentration and determination of trace levels of twelve pesticide residues from different samples with high content of solids without filtration. This method consists of a three–phase system including an aqueous phase (sample solution), acetonitrile, and hexane. The extraction mechanism is based on different affinities of the substances from the sample matrices towards each of the involved phase, which provides a high selectivity to the process. In other words, interfering hydrophobic compounds are transferred into hexane and will not be present in the final extract. Furthermore, ionic and polar compounds are retained in the aqueous phase. Therefore, only semi–polar compounds such as the studied pesticides are extracted into acetonitrile. In this method, a homogeneous solution of the aqueous phase and acetonitrile (a water–soluble extraction solvent) forms two clearly separated phases in the presence of sodium sulfate (as a phase separation agent) and simultaneously the analytes are extracted into the fine droplets of the acetonitrile collected on the