Glyphosate [N-(phosphonomethyl)glycine] has been one of the world’s most widely applied herbicides since it came on the market in 1970s under the trade name Roundup. It is used for weed control in agriculture, forestry and gardens, and also on railway embankments. Glyphosate is rapidly adsorbed in soil and degraded to aminomethylphosphonic acid (AMPA) its major metabolite and then transported to groundwater and surfacewater. The permissible level for individual pesticides including glyphosate and AMPA for drinking water is set at the pseudo-zero value of <0.1 µg/L by EU Directive. The high polarity and water-solubility of glyphosate and AMPA has, until recently, made their analysis in water samples problematic, especially at low levels. The aim of this study is to improve the extraction protocol in choosing the appropriate solid-phase extraction (SPE) sorbents in order to pre-concentrate the traces of glyphosate and AMPA and then the analysis is performed by method of high-performance liquid chromatography combined tandem mass spectrometry detection (LC-MS/MS). Due to a lack of adequate chemical groups (e.g. chromophores, UV absorption, fluorogenics), glyphosate and AMPA are derivatized with 9-fluorenylmethylchloroformate (FMOC-Cl) to form fluorescent derivatives and to reduce also the polar character of the analytes facilitating the chromatographic retention prior to the separation on column. Due to their strong polarity and in most cases ionic character, anionic and cationic resins have shown great effectiveness in the enrichment and clean-up of samples. For SPE, the study is realized on reversed-phase, strong anion-exchange and mixed-mode sorbents. The combination of the Oasis® HLB, PS-OH and Oasis® MAX cartridges are used for sample preparation to achieve high and reproducible recoveries (> 90%) for analysis of glyphosate and AMPA at low levels. Glyphosate and AMPA derivatized with FMOC then are separated in SunfireTM C18(50mm x 2.1mm i.d, 3.5µm) column prior to the determination on LC-MS/MS.

Auteurs du document : Tran Thi, N.T., Mazzella, N., Delmas, F.
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