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Effervescence assisted on-site liquid phase microextraction for the determination of five triazine herbicides in water

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Abstract

A novel effervescence assisted on-site liquid phase microextraction has been developed for the determination of five triazine herbicides in water. The use of an effervescent tablet composed of citric acid, sodium bicarbonate and 1-undecanol (extraction solvent) was the core of the method. The triazine herbicides in water were extracted by 1-undecanol released from tablet under effervescence and determined by ultra-high pressure liquid chromatography tandem mass spectrometer. The experimental variables, including NaCl concentration, temperature, weight of effervescent tablet, volume of extraction solvent and pH value, were screened by a Plackett-Burman design and optimized by a Box-Behnken design. Under the optimized conditions, good linearity was obtained in the range of 0.05 to 10 μg L^{-1} with correlation coefficients ranging from 0.9936 to 0.9988. The limits of quantification were between 7.6 and 26.4 ng L^{-1}, and the recoveries were in 71.4-93.2 % with relative standard deviations of 2.5-10.9%. This method, which does not require centrifugation and any special apparatus, was successfully applied to determine triazine herbicides in real waters, promising to be a way to speed field sampling procedures for the organic pollutants monitoring in water.

Keyword

Effervescent tablet, On-site liquid phase microextraction, Triazine herbicides, Water