Sensitive determination of seven triazine herbicide in honey, tomato and environmental water samples by hollow fiber based liquid-liquid-liquid microextraction combined with sweeping micellar electrokinetic capillary chromatography

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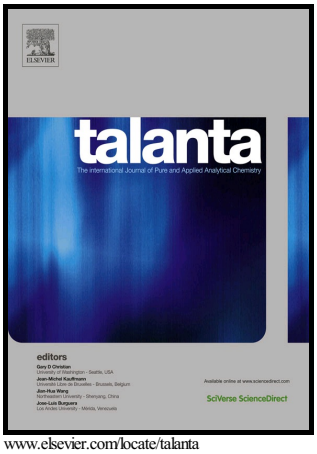

www.elsevier.com/locate/talanta

PII: S0039-9140(18)30359-X
DOI: https://doi.org/10.1016/j.talanta.2018.04.012
Reference: TAL18551

To appear in: *Talanta*

Received date: 19 November 2017
Revised date: 28 March 2018
Accepted date: 7 April 2018

Cite this article as: Qing Yang, Beibei Chen, Man He and Bin Hu, Sensitive determination of seven triazine herbicide in honey, tomato and environmental water samples by hollow fiber based liquid-liquid-liquid microextraction combined with sweeping micellar electrokinetic capillary chromatography, *Talanta,* https://doi.org/10.1016/j.talanta.2018.04.012

Sensitive determination of seven triazine herbicide in honey, tomato and environmental water samples by hollow fiber based liquid-liquid-liquid microextraction combined with sweeping micellar electrokinetic capillary chromatography

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Abstract

A rapid, simple, and effective method has been developed for the determination of seven triazine herbicides (terbutryn, prometryn, ametryn, prometon, propazine, atrazine, simazine) by coupling off-line hollow fiber liquid liquid liquid microextraction (HF-LLLME) with on-line sweeping micellar electrokinetic chromatography (sweeping-MEKC). In HF-LLLME, seven target triazines in hydrophobic form were extracted from the sample solution into decane impregnated in the pores of the hollow fiber, and then back-extracted into 1 mol L^{-1} H_3PO_4 inside the hollow fiber lumen. Then, the pH of acceptor phase was adjusted with 1 μL 1 mol L^{-1} NaOH for subsequent sweeping-MEKC analysis. In the sweeping-MEKC process, seven triazines were separated in about 16 min with a background electrolyte (BGE) consisting of 92 mmol L^{-1} phosphate, 40 mmol L^{-1} SDS and 15% (v/v) 1-propanol (pH=2.6). The hydrodynamic injection was performed at 50 mbar for 250 s. Under the optimized conditions, the limits of detection were in the range of 0.07-0.69 μg L^{-1} with enrichment factors of 3100-10000-fold for target triazines, with a dynamic linear range of 0.3/2-100 μg L^{-1}. The developed method exhibited excellent clean-up capability as well as high enrichment factors and was successfully applied to the analysis of target triazines in environmental water, honey and tomato samples.

Keywords:

Triazine herbicides; hollow fiber liquid-liquid-liquid microextraction; sweeping; micellar electrokinetic chromatography