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**Sensitive determination of seven triazine herbicide in honey, tomato  
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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<sup>-1</sup> H<sub>3</sub>PO<sub>4</sub> inside the hollow fiber lumen. Then, the pH of acceptor phase was adjusted with 1 μL 1 mol L<sup>-1</sup> 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<sup>-1</sup> phosphate, 40 mmol L<sup>-1</sup> 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<sup>-1</sup> with enrichment factors of 3100-10000-fold for target triazines, with a dynamic linear range of 0.3/2-100 μg L<sup>-1</sup>. 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

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