Supplementary information

Magnetic Fe_3O_4@SiO_2@β-cyclodextrin solid phase extraction of methyl parathion and fenthion in lettuce samples

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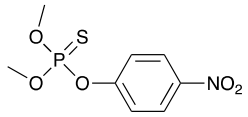
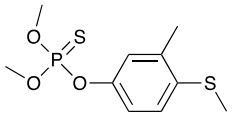
1. Optimization of synthesis conditions

In order to get better physical and chemical properties of Fe_3O_4@SiO_2@β-CD, the amount of cross-linker and solvent composition were optimized.

In the experiment, 1.0, 1.5, 2.0, 2.5 and 3.0 mL of EGDMA as the cross-linker were tested, respectively. The results showed that the amount of cross-linker lower than 2.0 mL led to the incomplete polymerization. With the amount of cross-linker increased, the product gradually appeared like a bulk. Thus, 2.0 mL of EGDMA were chosen.

The porogenic solvent plays a key role in the formation of the polymer. The ratios of methanol to DMF in porogenic solvent 9:1, 5:1, 4:1, 2:1, 1:1, and 1:2 were investigated, respectively. The results showed that too much DMF in porogenic solvent resulted in non-uniform dispersion of the monomer, and less DMF resulted in incomplete reaction. Therefore, the mixture of methanol and DMF (1:1, v:v) was chosen as the porogenic solvent.

Table S1 The physicochemical properties of methyl parathion and fenthion and maximum residue levels (MRLs) in European Union and China[a].

Compound		Methyl parathion	Fenthion
Formula		$C_8H_{10}NO_5PS$	$C_{10}H_{15}O_3PS_2$
Chemical structure			
MW (g mol^{-1})		263.21	278.33
Water Solubility (g L^{-1})		0.05	0.055
Log K_{ow}		2.86	4.091
MRL (μg kg^{-1})	European Union	10	20
	China	20	50

[a] References from and www.ec.europa.eu for EU MRLs and www.moa.gov.cn for China MRLs.

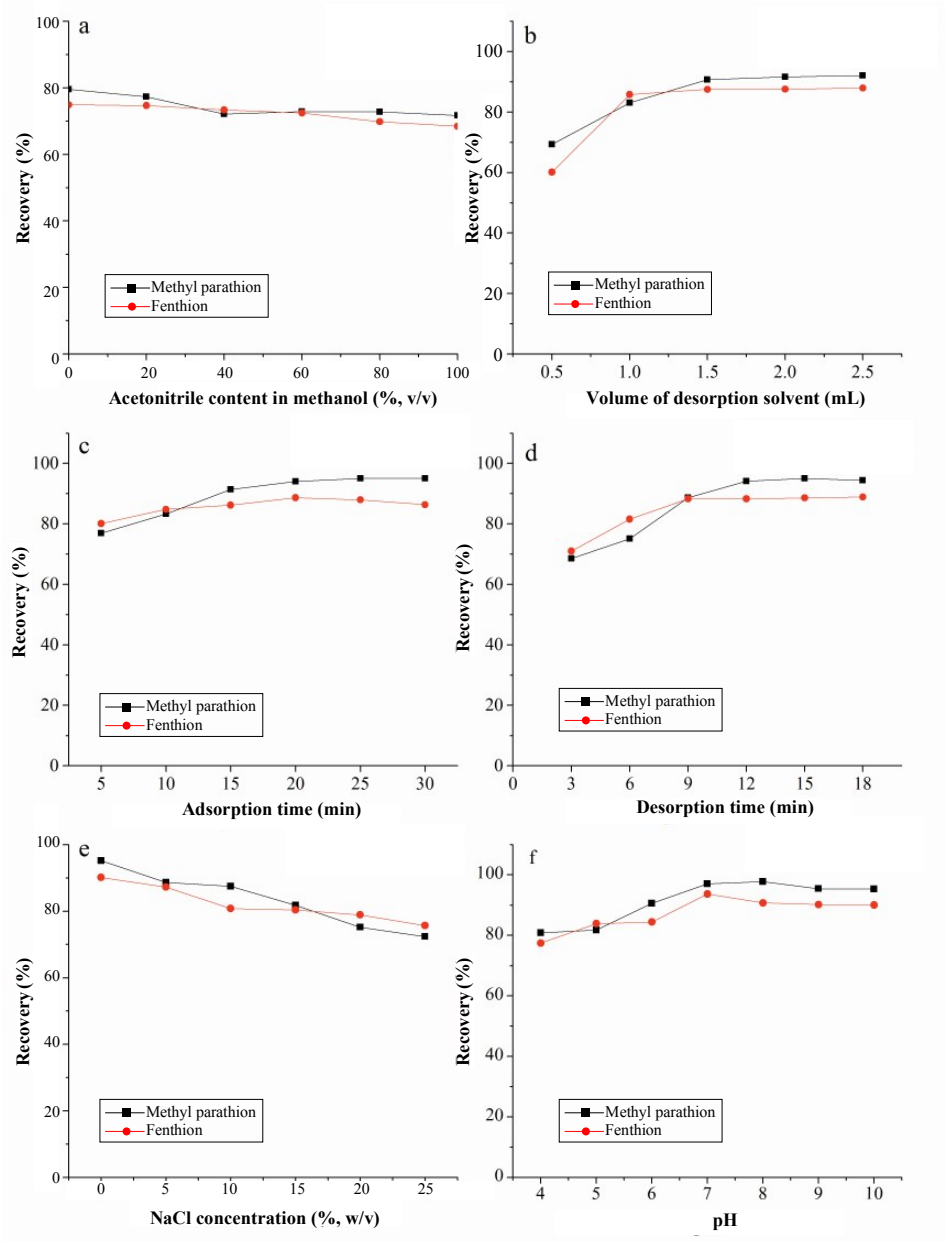


Fig. S1 Effect of desorption solvent type (a), desorption solvent volume (b), adsorption time (c), desorption time (d), sample ionic strength (e) and pH (f) on the extraction of methyl parathion and fenthion.