

Supplementary Information

A novel QuEChERS-like method and apparatus of automatic sample pre-treatment for fast determination of mercury speciation in aquatic animal samples

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Experimental section

The QuEChERS automated sample preparation system based on this work (SiO-6512, Beijing Ability Technique Co., Ltd., Beijing) is shown in Fig. S1.



Fig. S1 The picture of the QuEChERS automated sample preparation system. The left panel is the full picture of the SiO-6512 system; the right one is its inner picture (12 holes).

Real picture of the concentric tube extraction cells is shown in Fig. S2.



Fig. S2 The picture of the novel concentric tube extraction cell.

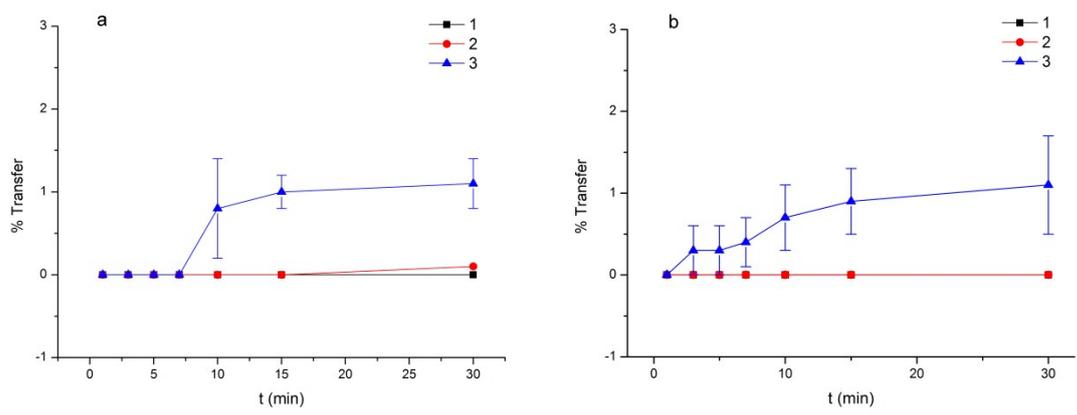


Fig. S3 Diffusion effects of KMnO₄ and BSA on PVDF membrane by centrifuging. Panel a is the diffusion effect of KMnO₄; Panel b is for BSA. Line 1 is the result when no extra force acting the tube (Fig. 2b); Line 2 is when cleaning up Hg species by shaking (Fig. 2e); Line 3 is when separating the analyte phase from interferences by centrifugation (Fig. 2f).

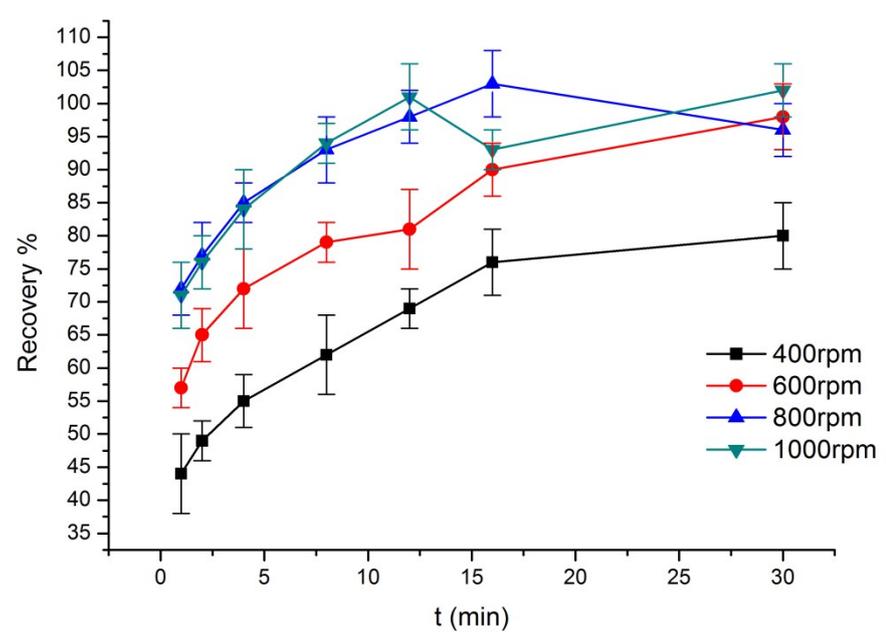


Fig. S4 The extracting efficiencies of Hg in fish sample by different shaking times and speeds. Here, we employed the powdered fish sample (CRM, GBW10029) for the recovery test, whose certified MeHg concentration is 0.85 ± 0.03 mg/kg.

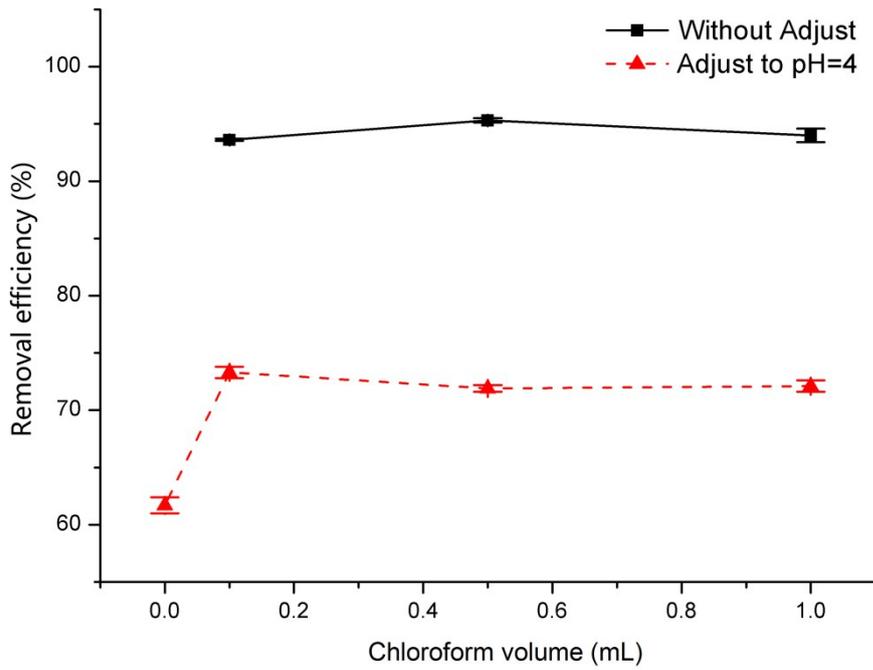


Fig. S5 The removal efficiencies of protein using different chloroform dosages.

Table S1. LOD for mercury species according to blank carp samples

Species	Calibration curve	Noise	LOD for extracts (ng/mL)	LOD for sample (ng/g)
MeHg	$I = 53699.3 \times C + 7861.0$	3848.3	0.22	2.2
Hg(II)	$I = 107954.4 \times C - 19497.7$	4315.6	0.12	1.2
EtHg	$I = 41742.4 \times C + 1217.9$	3265.8	0.24	2.4