

## Supporting Information

# Acetylcholinesterase-catalyzed Silver Deposition for Ultrasensitive Electrochemical Biosensing of Organophosphorus Pesticide

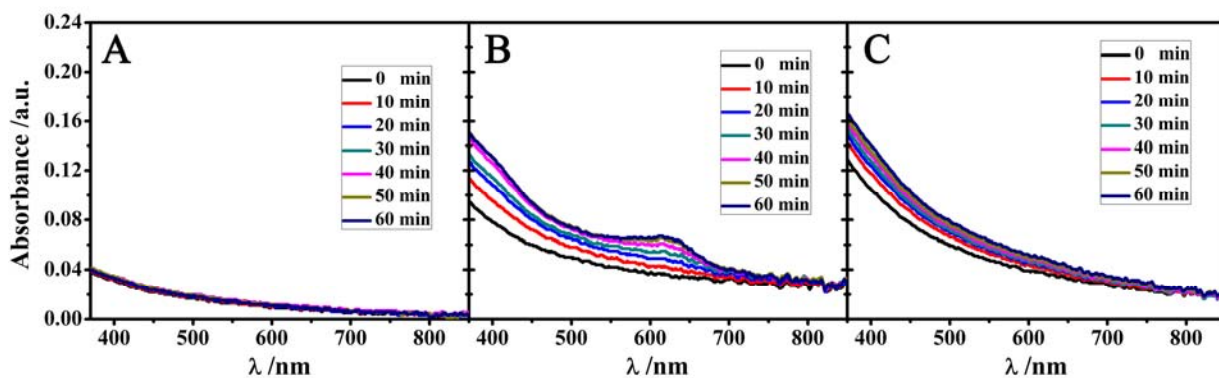
Zhenhui Liu, Xin Xia, Guoxing Zhou, Lei Ge,\* and Feng Li\*

College of Chemistry and Pharmaceutical Sciences, Qingdao Agricultural University, Qingdao,  
266109, People's Republic of China

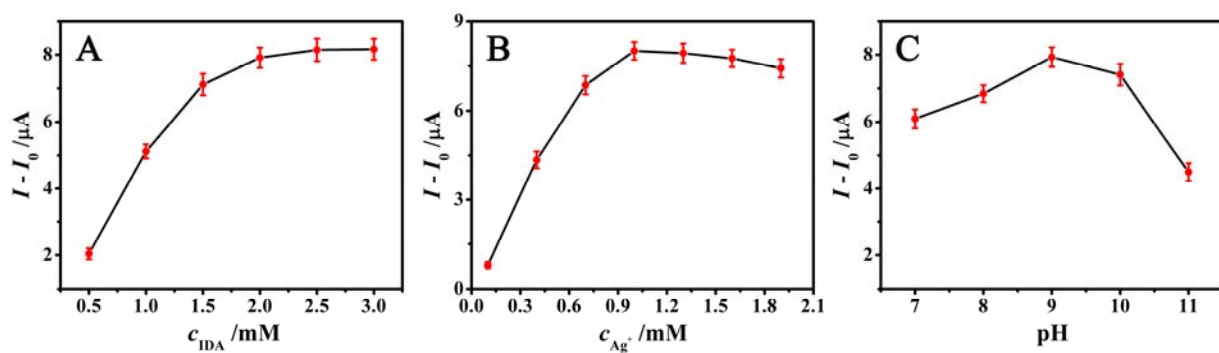
\*Corresponding author: Lei Ge, Feng Li

E-mail: lge@qau.edu.cn, lifeng@qust.edu.cn

Telephone: +86-532-86080855



**Figure S1.** (A) Time-dependent absorbance changes of 2.0 mM IDA solution. (B) Time-dependent absorbance changes of working solution containing 2.0 mM IDA, 1.0 mM  $\text{AgNO}_3$ , and 1.0 mU/mL AChE (exposed to air). (C) Time-dependent absorbance changes of 2.0 mM IDA solution containing 1.0 mU/mL AChE.



**Figure S2.** The effects of (A) IDA concentration, (B)  $\text{Ag}^+$  concentration, and (C) pH on the AChE-catalyzed silver deposition reaction.  $I_0$  and  $I$  are the peak current intensity of LSV curve in the absence and presence of 1.0 mU/mL AChE, respectively.

**Table S1.** Assay performance comparison of our electrochemical biosensor with other sensors for chlorpyrifos.

Detection method	Linear range	Detection limit	Reference
Electrochemical method	10 nM to 1.0 $\mu$ M	4.0 nM	1
Electrochemical method	0.1 ng/mL to 10 <sup>5</sup> ng/mL	33 pg/mL	2
Electrochemical method	20 $\mu$ M to 110 $\mu$ M	3.5 $\mu$ M	3
Electrochemical method	10 fM to 1.0 $\mu$ M	10 fM	4
Electrochemical method	1.5 nM to 40 nM	1.5 nM	5
Chemiluminescence	0.1 ng/mL to 50 ng/mL	33 pg/mL	6
Chemiluminescence	1.0 ng/mL to 60 ng/mL	33 pg/mL	7
Surface-Enhanced Raman Spectroscopy	----	1.0 $\mu$ M	8
Surface-Enhanced Raman Spectroscopy	1.0 nM to 10 $\mu$ M	0.78 nM	9
Microimmunoassay	0.26 ng/mL to 18 ng/mL	0.11 ng/mL	10
Photoelectrochemical method	0.3 ng/mL to 80 ng/mL	10 pg/mL	11
Photoelectrochemical method	0.2 $\mu$ M to 16 $\mu$ M	10 nM	12
Photoelectrochemical method	0.1 ng/mL to 50 ng/mL	30 pg/mL	13
Electrochromic method	100 fM to 1.0 mM	0.1 pM	14
Fluorescence	0.1 nM to 10 $\mu$ M	0.1 nM	15
Electrochemical method	10 pM to 10 nM	4.0 pM	This work

## References

- (1) Zamfir, L.-G.; Rotariu, L.; Bala, C. *Biosensors and Bioelectronics* **2011**, *26*, 3692-3695.
- (2) Jiao, Y.; Hou, W.; Fu, J.; Guo, Y.; Sun, X.; Wang, X.; Zhao, J. *Sensors and Actuators B: Chemical* **2017**, *243*, 1164-1170.
- (3) Kumaravel, A.; Chandrasekaran, M. *Journal of Agricultural and Food Chemistry* **2015**, *63*, 6150-6156.
- (4) Talan, A.; Mishra, A.; Eremin, S. A.; Narang, J.; Kumar, A.; Gandhi, S. *Biosensors and Bioelectronics* **2018**, *105*, 14-21.
- (5) Chauhan, N.; Narang, J.; Pundir, C. S. *Biosensors and Bioelectronics* **2011**, *29*, 82-88.
- (6) Ouyang, H.; Lu, Q.; Wang, W.; Song, Y.; Tu, X.; Zhu, C.; Smith, J. N.; Du, D.; Fu, Z.; Lin, Y. *Analytical Chemistry* **2018**, *90*, 5147-5152.
- (7) Ouyang, H.; Tu, X.; Fu, Z.; Wang, W.; Fu, S.; Zhu, C.; Du, D.; Lin, Y. *Biosensors and Bioelectronics* **2018**, *106*, 43-49.
- (8) Xu, Q.; Guo, X.; Xu, L.; Ying, Y.; Wu, Y.; Wen, Y.; Yang, H. *Sensors and Actuators B: Chemical* **2017**, *241*, 1008-1013.
- (9) Yao, G.-H.; Liang, R.-P.; Huang, C.-F.; Wang, Y.; Qiu, J.-D. *Analytical Chemistry* **2013**, *85*, 11944-11951.
- (10) Dobosz, P.; Morais, S.; Bonet, E.; Puchades, R.; Maquieira, Á. *Analytical Chemistry* **2015**, *87*, 9817-9824.
- (11) Wang, H.; Zhang, B.; Zhao, F.; Zeng, B. *ACS Applied Materials & Interfaces* **2018**, *10*, 35281-35288.
- (12) Li, H.; Li, J.; Xu, Q.; Hu, X. *Anal. Chem.* **2011**, *83*, 9681-9686.
- (13) Liu, Q.; Yin, Y.; Hao, N.; Qian, J.; Li, L.; You, T.; Mao, H.; Wang, K. *Sensors and Actuators B: Chemical* **2018**, *260*, 1034-1042.
- (14) Capoferri, D.; Álvarez-Diduk, R.; Del Carlo, M.; Compagnone, D.; Merkoçi, A. *Analytical Chemistry* **2018**, *90*, 5850-5856.
- (15) Zhang, K.; Mei, Q.; Guan, G.; Liu, B.; Wang, S.; Zhang, Z. *Analytical Chemistry* **2010**, *82*, 9579-9586.