

A Highly Sensitive, Dual-Readout Assay Based on Gold Nanoparticles for Organophosphorus and Carbamate Pesticides

Dingbin Liu^{1,3 †}, Wenwen Chen^{1,3†}, Jinhua Wei^{2,3}, Xuebing Li², Zhuo Wang^{1}, and Xingyu Jiang^{1*}*

1. CAS Key Lab for Biological Effects of Nanomaterials and Nanosafety, National Center for Nanoscience and Technology, 11 Beiyitiao, Zhongguancun, Beijing, 100190 (China)

2. Institute of Microbiology, Chinese Academy of Science, No.8 North 2nd Street, Haidian District, Beijing, 100190 (China)

3. Graduate University of Chinese Academy of Sciences, Shijingshan, Yuquan Road, 19(A), Beijing, 100049 (China)

* To whom correspondence should be addressed.

† These authors contributed equally to this work.

E-mail: xingyujiang@nanoctr.cn; wangz@nanoctr.cn

Fax: (+86)10-82545631

Phone: (+86)10-82545611

Figures:

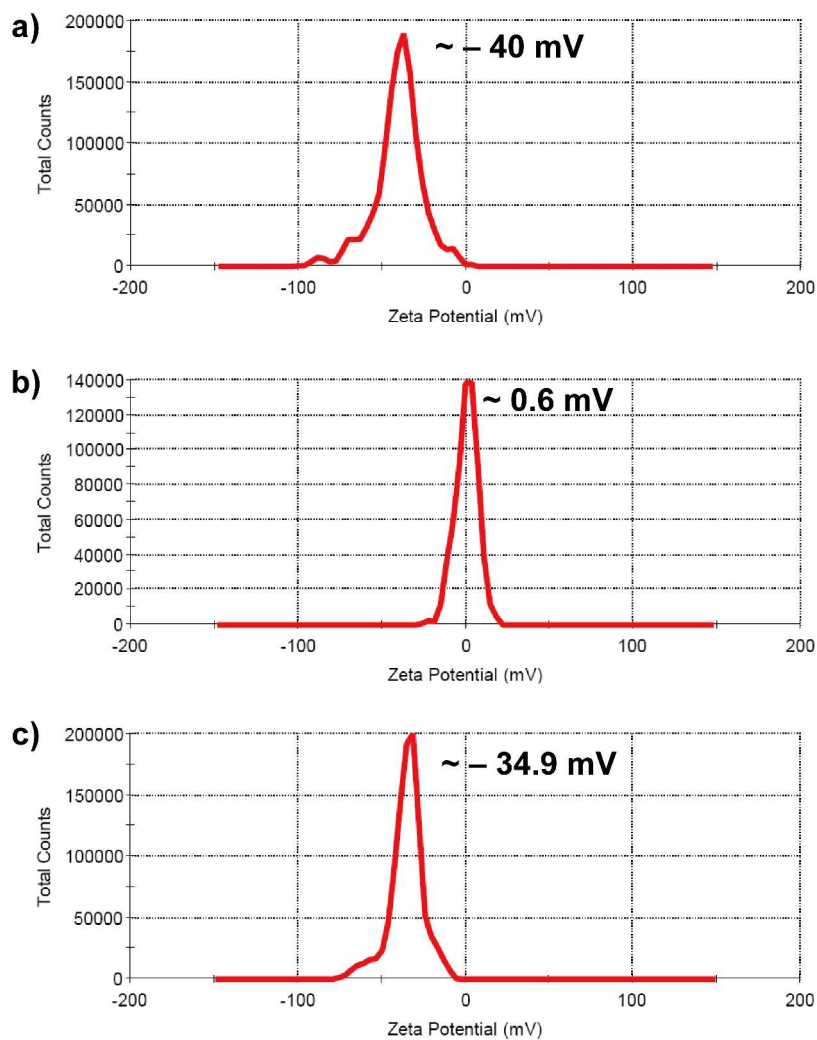


Figure S1. Zeta Potential Measurement of RB-AuNPs solutions before a) and after b) adding AChE and ATC, and c) that of RB-AuNPs solution containing AChE which was pretreated with Carbaryl (100 µg/L) and ATC was added finally. The concentration of AChE was set to be 1 U/mL, and that of ATC was 20 µM.

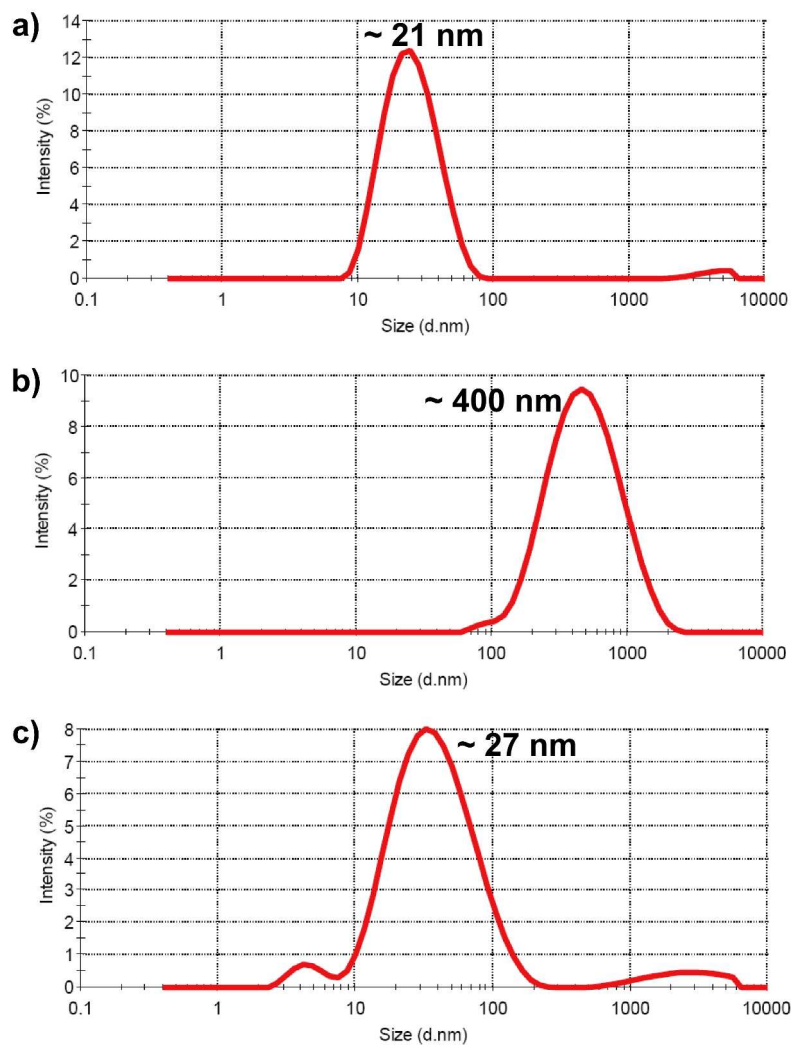


Figure S2. DLS measurements of RB-AuNPs solutions before a) and after b) adding AChE and ATC, and c) that of RB-AuNPs solution containing AChE which was pretreated with Carbaryl (100 $\mu\text{g/L}$) and ATC was added finally. The concentraion of AChE was set to be 1 U/mL, and that of ATC was 20 μM .

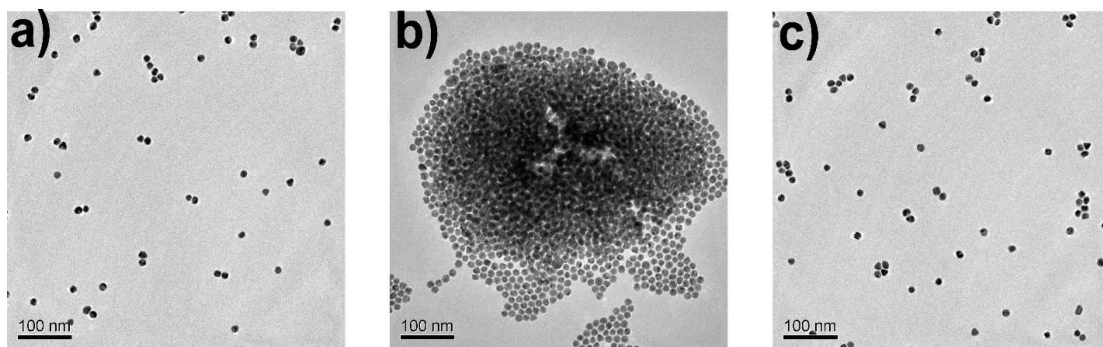


Figure S3. TEM images confirmed the variations of aggregation states of RB-AuNPs. a) Well-dispersed RB-AuNPs. b) The RB-AuNPs aggregates were formed after adding AChE and ATC. c) The formation of RB-AuNPs aggregates was prevented by pretreating AChE with Carbaryl (100 $\mu\text{g/L}$).

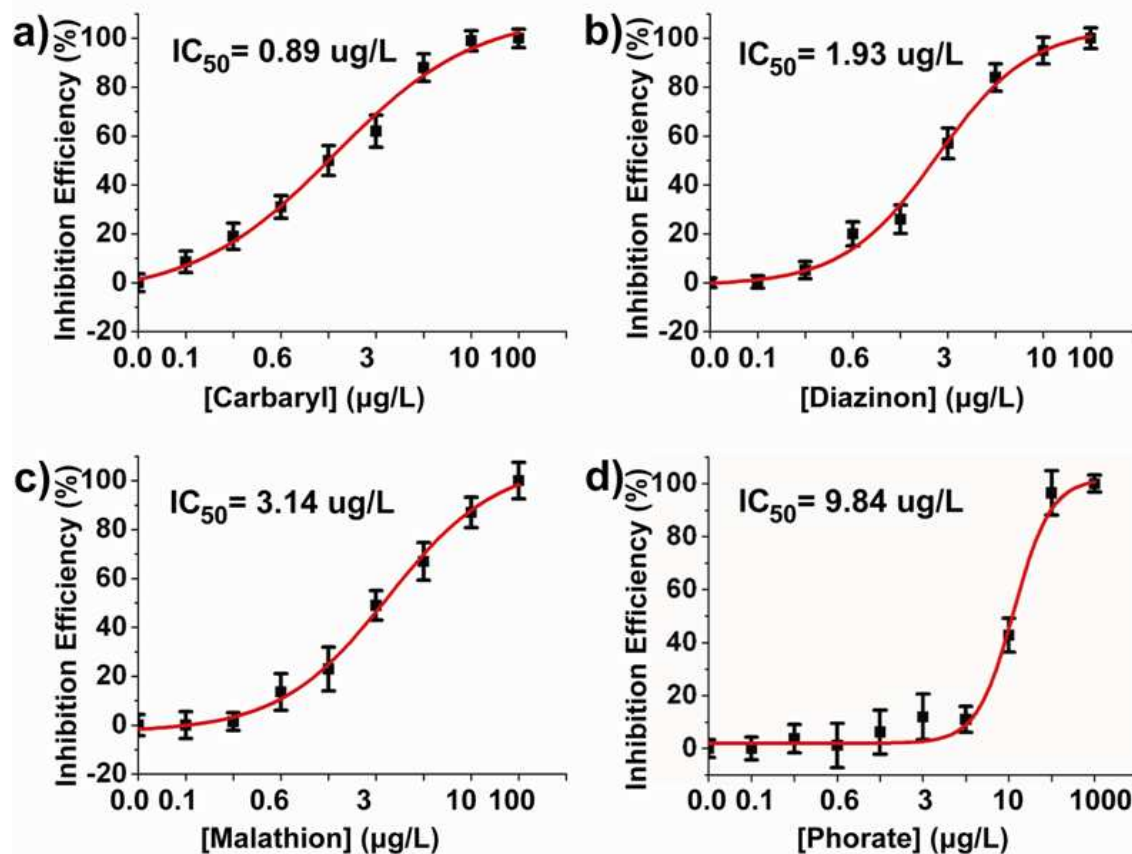


Figure S4. The inhibition efficiencies of different AChE inhibitors versus their concentrations. a) Carbaryl, b) Diazinon, c) Malathion, d) Phorate. The standard deviations of the samples were calculated by a sample size of 6.

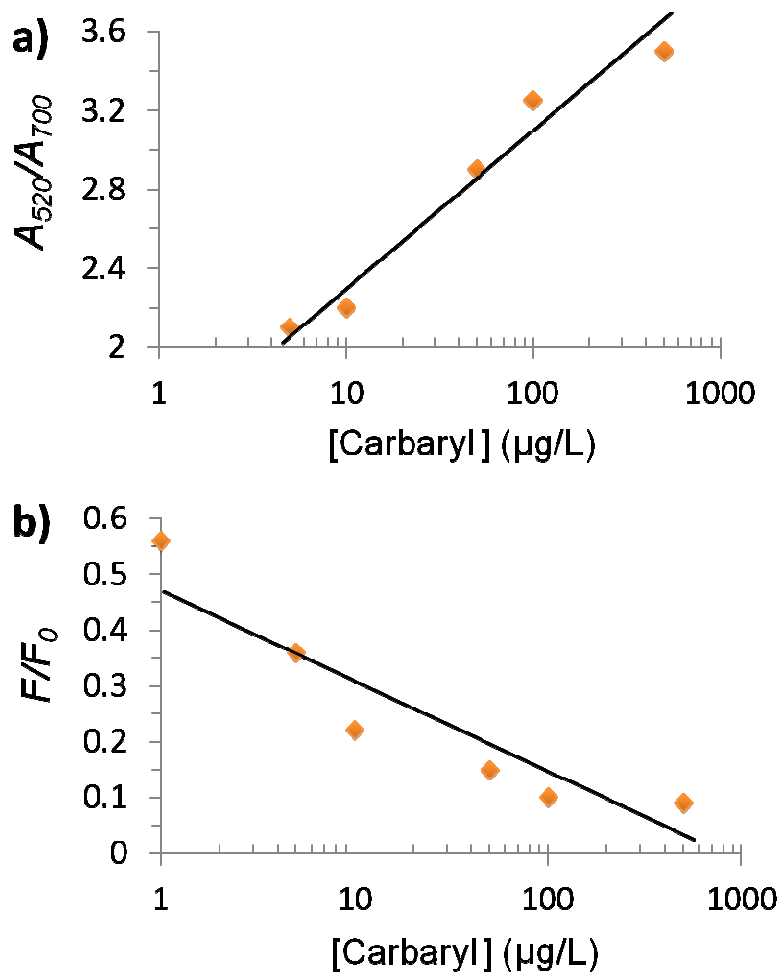


Figure S5. Dependence of A_{520}/A_{700} values (a) and their corresponding F/F_0 values (b) on various concentrations of sprayed Carbaryl residues in the mixture of tomatoes and cucumbers samples.

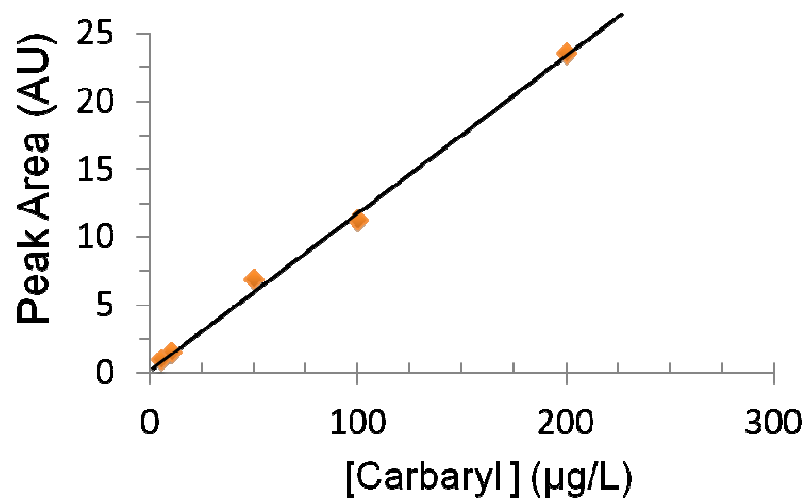


Figure S6. HPLC analysis-calibrated standard curve of the sprayed Carbaryl residues in the mixture of tomatoes and cucumbers samples.