

Supporting materials

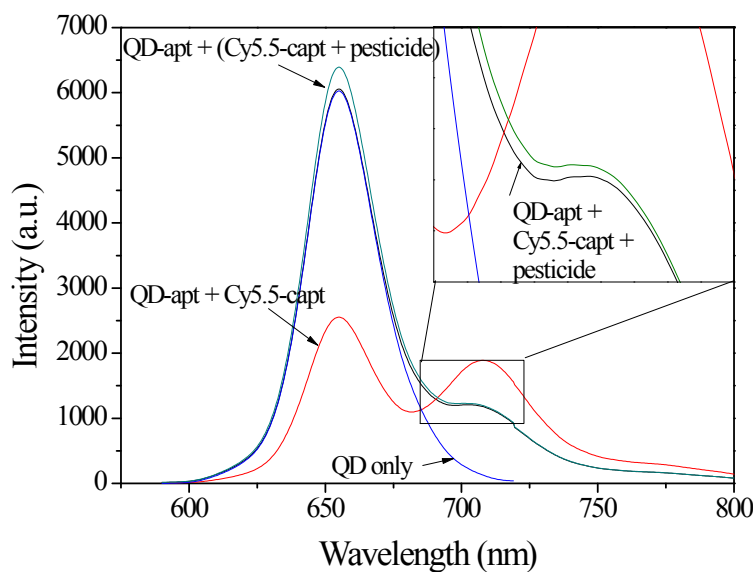


Figure S1. Emission spectra for complexes of bared QD, QD-apt and Cy5.5-capt, QD-apt with Cy5.5-capt and acetamiprid, as well as mixture of Cy5.5-capt and acetamiprid before QD-apt added.

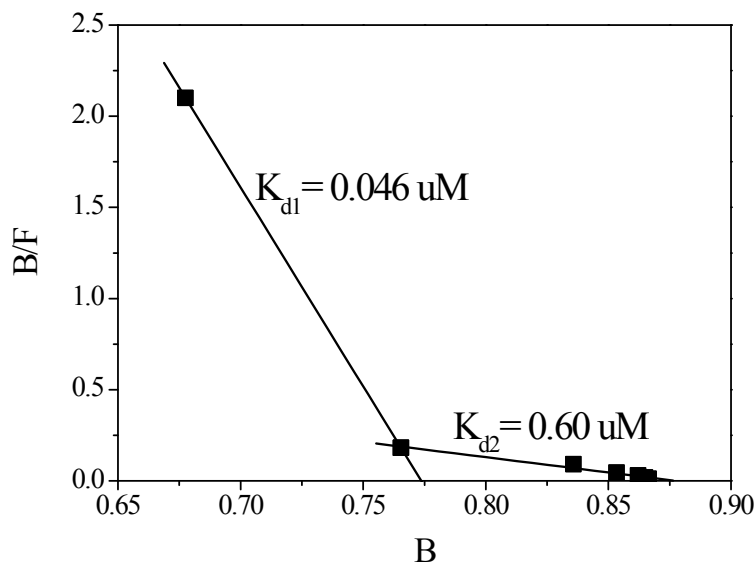


Figure S2. Scatchard plotting for the determination of affinity adsorption  $K_{d1}$  ( $0.046 \mu\text{mol/L}$ ) and general adsorption  $K_{d2}$  ( $0.60 \mu\text{mol/L}$ ).

**Table. S1** Determination of acetamiprid in water samples by the proposed method

Sample	Spiked Concentration (µg/L)	Detected Concentration (µg/L)	Standard Deviation (µg/L)	Recovery (%)
Tap water	0.05	0.0509	0.00216	101.8
	0.2	0.196	0.0083	98
	1	1.005	0.0493	100.5
Lake water	0.1	0.100	0.00532	100
	0.5	0.498	0.0225	99.6
	1	1.03	0.0342	103

\* The mean value of average concentration calculated from 10 tests.

Table S2 Comparison of the analytical performance of different acetamiprid detection methods

Alagnosis Method	Linear Calibrations Range (nmol/L)	Detection Limit (nmol/L)	Reference
High-Performance Liquid Chromatography with a C-18 column and diode-array detection	224.547 ~ 44909.507	44.91	(Obana et al. 2002)
Gas Chromatography–mass spectrometry- mass spectrometry	-	4.491	(Mateu-Sanchez et al. 2003)
High-performance liquid chromatography coupled with UV-Vis detector	0.000359 ~ 0.449	30.089	(Zhou, Ding and Xiao 2006)
Liquid chromatography–mass spectrometry	2250 ~ 22500	135	(Fidente et al. 2005)
Liquid Chromatography–mass spectrometry	-	449.095	(Obana et al. 2003)
Ultra performance liquid chromatography- mass spectrometry- mass spectrometry	0.112 ~ 673.643	5.838	(Liu et al. 2010)
Colorimetric assays based on aggregation-induced red-to-blue color transition	660 ~ 6600	44	(Xu et al. 2011)
Derivative spectrophotometric method in the presence of 6-	3690 ~ 62000	719	(Guzsvany et al. 2012)

chloronicotinic acid			
Chemiluminescence aptasensor	0.8 ~ 630	0.062	(Qi et al. 2016)
Colorimetric aptasensor based on hemin-functionalized reduced graphene oxide	100 ~ 60000	40	(Yang et al. 2015)
ELISA using Monoclonal antibodies specific to acetamiprid	1.35 ~ 56	0.00449	(Watanabe et al. 2006)
Electrochemical impedance spectroscopy-based aptasensor	5 ~ 600	1	(Fan et al. 2013)
Silver nanoparticles anchored on nitrogen-doped graphene as a novel electrochemical biosensing	0.0001 ~ 5	0.000033	(Jiang et al. 2015)
Electrochemical sensor	0.01 ~ 2	0.2	(Jin et al. 2016)
Solid-phase extraction/liquid chromatography–mass spectrometry	220 ~ 2200	90	(Di Muccio et al. 2006)
Electrochemical impedance spectroscopy -based aptasensor	0.00005 ~ 10000	0.000017	(Fei et al. 2015)
Electrochemical sensor	13300 ~ 212000	40000	(Guzsvany et al. 2008)
Aptamersensor based on FRET	10~10000	20	This work

## Reference

- Di Muccio, A., P. Fidente, D. A. Barbini, R. Dommarco, S. Seccia & P. Morrica (2006) Application of solid-phase extraction and liquid chromatography-mass spectrometry to the determination of neonicotinoid pesticide residues in fruit and vegetables. *Journal of Chromatography A*, 1108, 1-6.
- Fan, L., G. Zhao, H. Shi, M. Liu & Z. Li (2013) A highly selective electrochemical impedance spectroscopy-based aptasensor for sensitive detection of acetamiprid. *Biosensors & Bioelectronics*, 43, 12-18.
- Fei, A., Q. Liu, J. Huan, J. Qian, X. Dong, B. Qiu, H. Mao & K. Wang (2015) Label-free impedimetric aptasensor for detection of femtomole level acetamiprid using gold nanoparticles decorated multiwalled carbon nanotube-reduced graphene oxide nanoribbon composites. *Biosensors & Bioelectronics*, 70, 122-129.
- Fidente, P., S. Seccia, F. Vanni & P. Morrica (2005) Analysis of nicotinoid insecticides residues in honey by solid matrix partition clean-up and liquid chromatography-electrospray mass spectrometry. *Journal of Chromatography A*, 1094, 175-178.

- Guzsvany, V., M. Kadar, Z. Papp, L. Bjelica, F. Gaal & K. Toth (2008) Monitoring of photocatalytic degradation of selected neonicotinoid insecticides by cathodic voltammetry with a bismuth film electrode. *Electroanalysis*, 20, 291-300.
- Guzsvany, V. J., S. D. Lazic, N. Vidakovic & Z. J. Papp (2012) Derivative spectrophotometric determination of acetamiprid in the presence of 6-chloronicotinic acid. *Journal of the Serbian Chemical Society*, 77, 911-917.
- Jiang, D., X. Du, Q. Liu, L. Zhou, L. Dai, J. Qian & K. Wang (2015) Silver nanoparticles anchored on nitrogen-doped graphene as a novel electrochemical biosensing platform with enhanced sensitivity for aptamer-based pesticide assay. *Analyst*, 140, 6404-6411.
- Jin, D., Q. Xu, L. Yu, A. Mao & X. Hu (2016) A novel sensor for the detection of acetamiprid in vegetables based on its photocatalytic degradation compound. *Food Chemistry*, 194, 959-965.
- Liu, S., Z. Zheng, F. Wei, Y. Ren, W. Gui, H. Wu & G. Zhu (2010) Simultaneous Determination of Seven Neonicotinoid Pesticide Residues in Food by Ultrapformance Liquid Chromatography Tandem Mass Spectrometry. *Journal of Agricultural and Food Chemistry*, 58, 3271-3278.
- Mateu-Sanchez, M., M. Moreno, F. J. Arrebola & J. L. M. Vidal (2003) Analysis of acetamiprid in vegetables using gas chromatography-tandem mass spectrometry. *Analytical Sciences*, 19, 701-704.
- Obana, H., M. Okihashi, K. Akutsu, Y. Kitagawa & S. Hori (2002) Determination of acetamiprid, imidacloprid, and nitenpyram residues in vegetables and fruits by high-performance liquid chromatography with diode-array detection. *Journal of Agricultural and Food Chemistry*, 50, 4464-4467.
- (2003) Determination of neonicotinoid pesticide residues in vegetables and fruits with solid phase extraction and liquid chromatography mass spectrometry. *Journal of Agricultural and Food Chemistry*, 51, 2501-2505.
- Qi, Y., F.-R. Xiu, M. Zheng & B. Li (2016) A simple and rapid chemiluminescence aptasensor for acetamiprid in contaminated samples: Sensitivity, selectivity and mechanism. *Biosensors & Bioelectronics*, 83, 243-249.
- Watanabe, E., S. Miyake, K. Baba, H. Eun & S. Endo (2006) Immunoassay for acetamiprid detection: application to residue analysis and comparison with liquid chromatography. *Analytical and Bioanalytical Chemistry*, 386, 1441-1448.
- Xu, Q., S. Du, G.-d. Jin, H. Li & X. Y. Hu (2011) Determination of acetamiprid by a colorimetric method based on the aggregation of gold nanoparticles. *Microchimica Acta*, 173, 323-329.
- Yang, Z., J. Qian, X. Yang, D. Jiang, X. Du, K. Wang, H. Mao & K. Wang (2015) A facile label-free colorimetric aptasensor for acetamiprid based on the peroxidase-like activity of hemin-functionalized reduced graphene oxide. *Biosensors & Bioelectronics*, 65, 39-46.
- Zhou, Q., Y. Ding & J. Xiao (2006) Sensitive determination of thiamethoxam, imidacloprid and acetamiprid in environmental water samples with solid-phase extraction packed with multiwalled carbon nanotubes prior to high-performance liquid chromatography. *Analytical and Bioanalytical Chemistry*, 385, 1520-1525.

