

A gold nanoparticles-based visual aptasensor for rapid detection of acetamiprid residues in agricultural products by using a smartphone

Chengnan Xu ^{a,1,*}, Mei Lin ^{a,1}, Chaonan Song ^b, Danli Chen ^b, Caimiao Bian ^{b,*}

^aZhejiang Citrus Research Institute, Taizhou, 318026, China

^bSchool of Life Science, Taizhou University, Taizhou, 318001, China

*Correspondence: xcnpub@163.com (C. Xu), blancaimiao@tzc.edu.cn (C. Bian)

¹These authors contributed equally to this work.

Figure S1. 3D printed black box illuminated with two LED lamps.



Figure S2. The trend of R/G/B value with increment of acetamiprid.

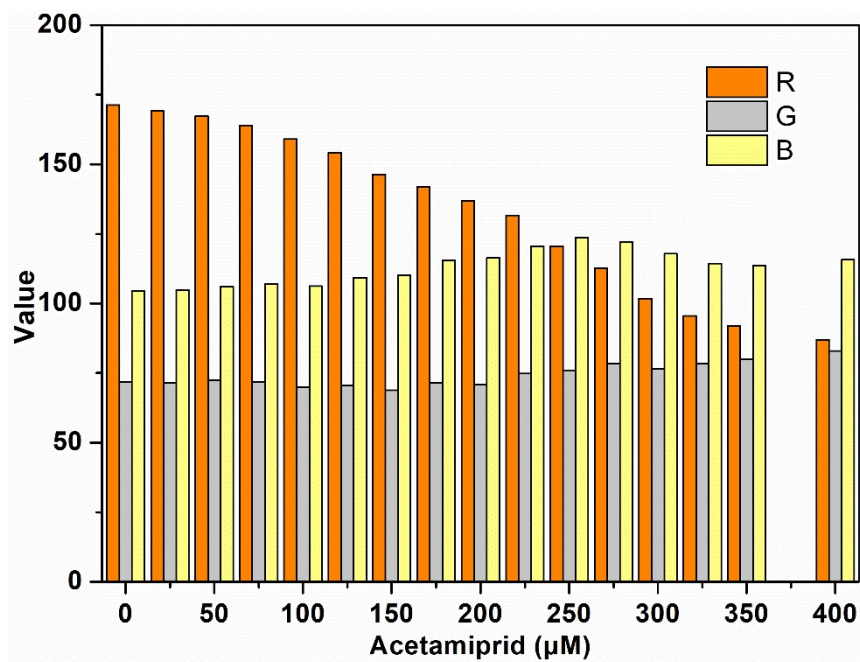


Figure S3. (a) UV-vis absorption of the visual sensing method with different concentrations of acetamiprid in the range from 0 to 400 μM . (b) The calibration curve of different acetamiprid concentrations ranging from 0 to 220 μM .

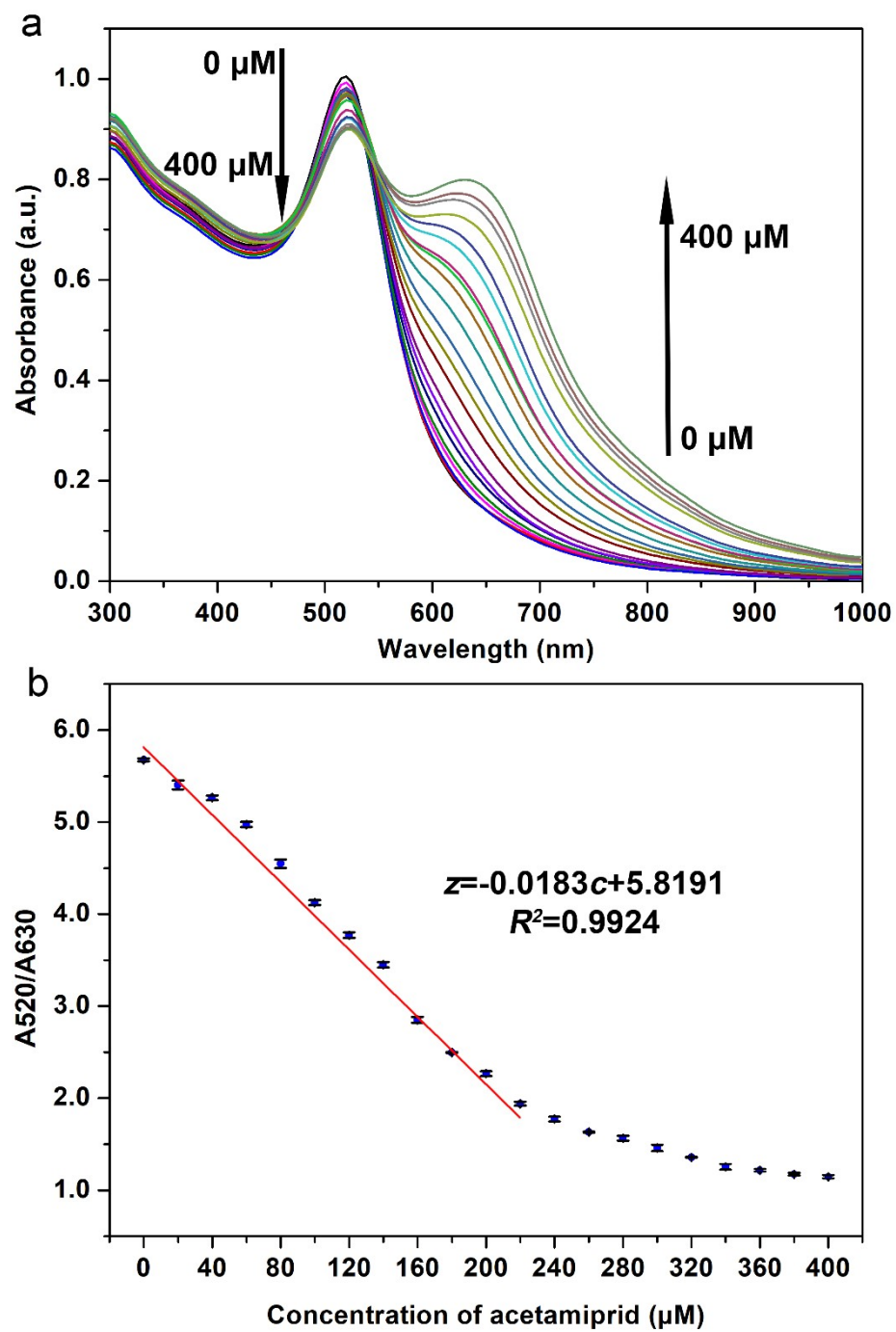


Table S1. Comparison of the reported aptasensor for acetamiprid detection.

Methods	Detected range	LOD	Ref.
SERS	1-10000 nM	10 nM	[1]
Fluorescence	20–500 nM	5.73 nM	[2]
Fluorescence	0.5-100 ng·mL ⁻¹	166.7 pg·mL ⁻¹	[3]
Chemiluminescence	0.021-9 nM	8.9 pM	[4]
Electrochemical	0.1pM-10 nM	0.0576 pM	[5]
Electrochemical	50-450 fM	14 fM	[6]
Colorimetric	0.4-4.5 ppb	0.24 ppb	[7]
Colorimetric	25-300 μM	3.81 μM	This work

References

- [1] Zhou J., Wang D., Yang H., et al. Specific detection of acetamiprid with aptamer based on flexible and adhesive SERS membrane[J]. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 2021: 120801.
- [2] Zhao Y., Zhang H., Wang Y., et al. A low-background fluorescent aptasensor for acetamiprid detection based on DNA three-way junction-formed G-quadruplexes and graphene oxide[J]. *Analytical and bioanalytical chemistry*, 2021, 413(8): 2071-2079.
- [3] Wang K., Wang Y., Li Q., et al. A fluorescence and localized surface plasmon resonance dual-readout sensing strategy for detection of acetamiprid and organophosphorus pesticides[J]. *Sensors and Actuators B: Chemical*, 2022, 351: 130977.
- [4] Xiu F., Lu Y., Qi Y., et al. Ultrasensitive and practical chemiluminescence sensing pesticide residue acetamiprid in agricultural products and environment: Combination of synergistically coupled co-amplifying signal and smart interface engineering[J]. *Talanta*, 2021, 235: 122811.
- [5] Guo Y., Yang F., Yao Y., et al. Novel Au-tetrahedral aptamer nanostructure for the electrochemiluminescence detection of acetamiprid[J]. *Journal of Hazardous Materials*, 2021, 401: 123794.
- [6] Hamami M., Raouafi N., Korri-Yousoufi H. Self-assembled MoS₂/SsDNA nanostructures for the capacitive aptasensing of acetamiprid insecticide[J]. *Applied Sciences*, 2021, 11(4): 1382.
- [7] Yang L., Wang X., Sun H., et al. A syringe-aided apta-nanosensing method for colorimetric determination of acetamiprid[J]. *Analytica chimica acta*, 2021, 1150: 238118.