

Electronic Supplementary Information

Target-induced and equipment-free biosensor for amplified visual detection of pesticide acetamiprid with high sensitivity and selectivity

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Circular dichroism (CD) experiment

CD spectra were measured on a Chirascan Circular Dichroism Spectrometer (Applied Photophysics Ltd, England, UK) at room temperature. The hairpin probe solution (5 μM) was prepared in 20 mM Tris-HCl, 100 mM NaCl, 10 mM MgCl_2 , pH 7.4. The solution at different temperatures were tested. CD spectra from 320 to 220 nm were recorded in 1 mm path length cuvettes and averaged from three scans with the buffer background subtracted.

CD was used to characterize the secondary structure change of the hairpin probe at different temperatures. As shown in Fig. S1, at 25 $^{\circ}\text{C}$, the hairpin probe showed a positive peak near 275 nm and a negative peak near 245 nm, which referred to the typical characteristic of B-form DNA double helix structure in the hairpin probe.¹⁻³ When the temperature raised to 37 $^{\circ}\text{C}$, the value of peaks decreased obviously at 245 nm and 275 nm, indicating the decrease of the base pairs in hairpin probe. When the temperature was at 45 $^{\circ}\text{C}$, the hairpin conformation would be destroyed. In this state, the peaks at 245 nm and 275 nm were almost disappeared. In our experiments, 25 $^{\circ}\text{C}$ was considered to be the optimum incubation temperature.

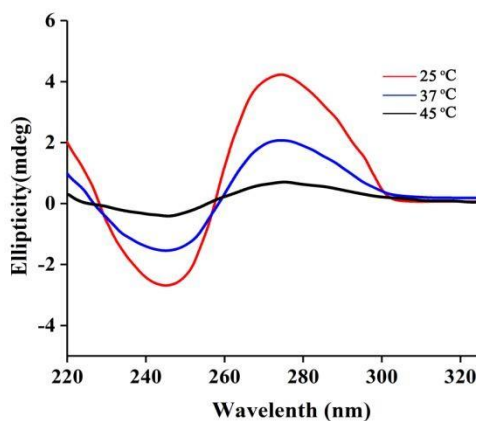


Fig. S1 CD spectra for analyzing the hairpin probe structure at different temperatures (25, 37, and 45 $^{\circ}\text{C}$). Concentrations of the HP probe were 5 μM .

Table S1 Comparison of the sensing methods for acetamiprid detection

Sensing Strategy	Detection Limit	References
FRET-based chemosensor	20 nM	4
Aptamer based fluorometric assay	127 pM	5
Fluorescent assay based on gold nanoparticles and quantum dots	7.29 nM	6
Electrochemical sensor based on the use of an unmodified gold electrode	153 pM	7
Photoelectrochemical aptasensing based on MoS ₂ nanoplates and quantum dots.	16.7 fM	8
Triple-helix molecular switch for fluorescent detection	9.12 nM	9
A colorimetric detection based on Au nanoparticles	400 nM	10
Colorimetric aptasensor based on hemin-functionalized reduced graphene oxide	40 nM	11
Photoelectrochemical aptasensor based on magnetic semiconductor nanoparticles	180 pM	12
Impedimetric aptasensor based on microwires formed by platinum nanoparticles	1 pM	13
Target-induced and equipment-free biosensor for amplified visual detection	10 pM	This work

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