

Supporting information

for

A portable multi-channel sensing device using Au nano-urchins as probes for melamine detection in milk

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Figures:

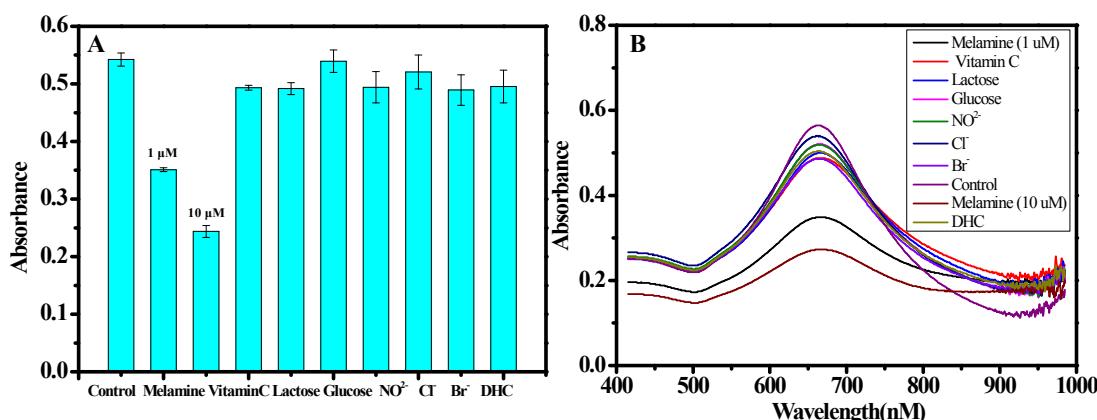
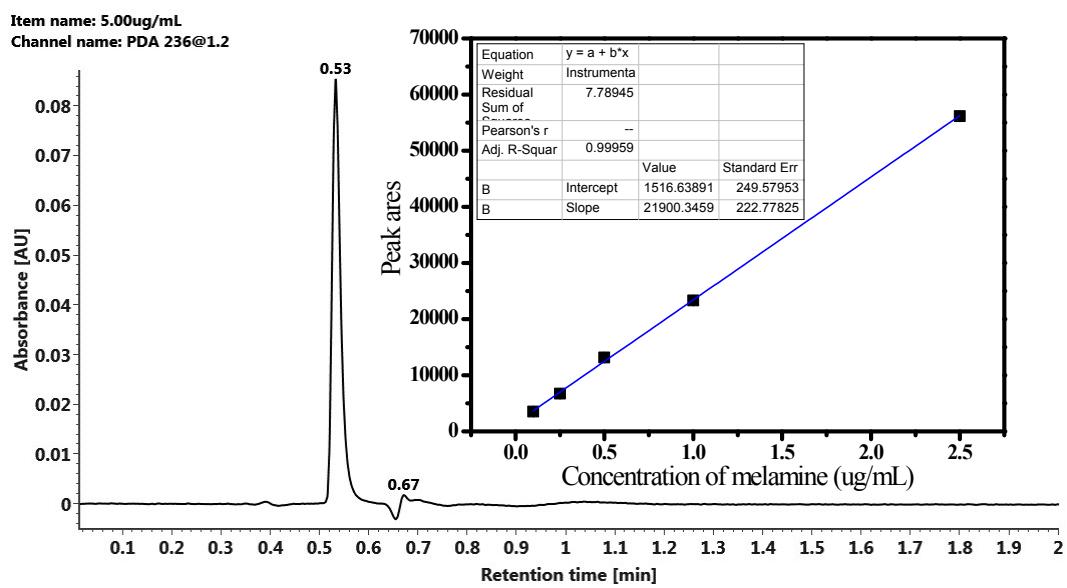


Fig. S1 Selectivity test (melamine: 1 and 10 μ M, the other interference subsistence: 10 μ M).

A



B

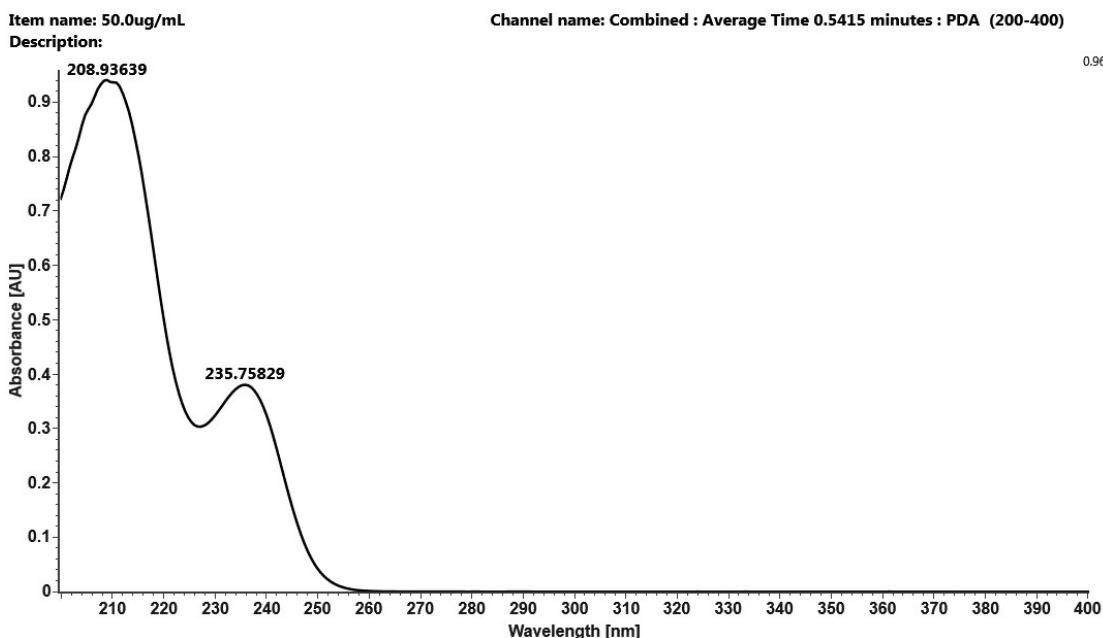


Fig. S2 A: HPLC analysis for the milk sample. Black curves are used to construct calibration as displayed in the inserted picture, B: Absorbance spectra of Melamine.

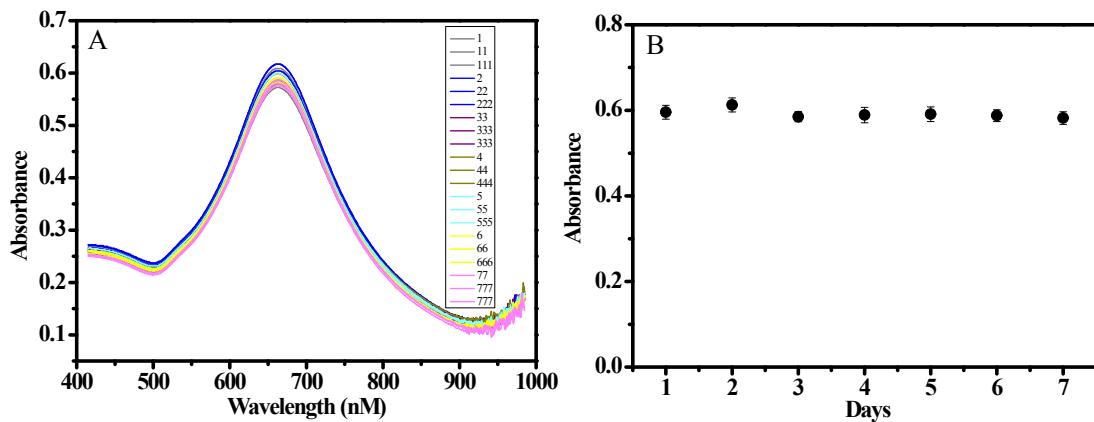


Fig. S3 The shelf-time test of as-prepared Au nano-urchins versus days of storage.

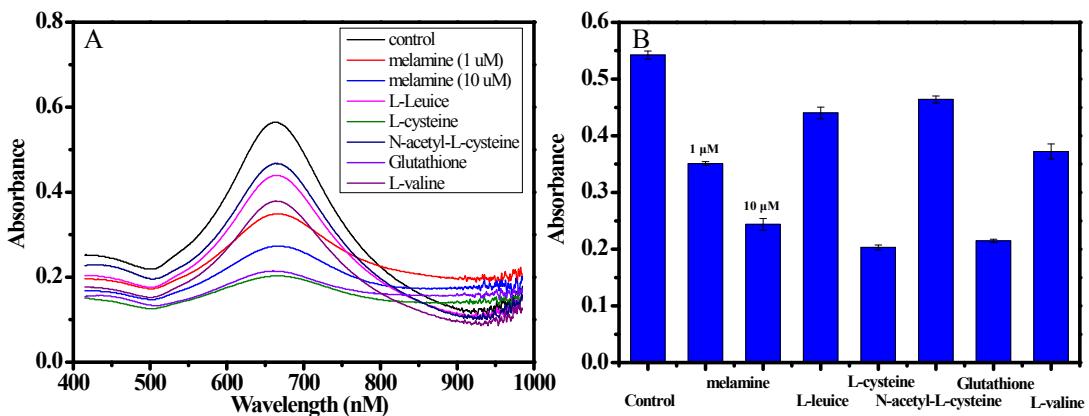


Fig. S4 Selectivity test (including five kinds of bio-thiols and amino acids, concentration: 10 μM).

Note: According to Fig. S4, L-Cysteine and Glutathione could also induce obvious aggregation of Au nano-urchins. Hence, it is suggested that this method is feasible when milk sample is in quality guarantee period, and will be out of function when milk samples exceed shelf time.

Tables:

Table S1 The detection limit of the other methods for melamine detection.

Method	System	Detection limit (nM)	Reference
Localized surface plasmon resonance-light scattering (color visualization)	Polythymine modified AuNPs	20	S1
Fluorescence	amino-functionalized carbon dots	36 nM	S10
Fluorescence	citrate-stabilized AuNPs and L-cysteine capped Cds	0.017 mg/L	S2

	QDs		
Fluorescence	Fluorescence resonance energy transfer between upconversion nanoparticles and AuNPs	18 nM	S6
Colorimetric visualization	Bare AuNPs coupling with TMB/H ₂ O ₂ chormogenic reaction	0.2 nM	S3
Immunoassay	enzyme-linked immunosorbent assay using a monoclonal antibody	0.01ng/mL	S4
Colorimetric detection	cysteamine-modified gold nanoparticles	1 mg/mL	S5
Fluorescence	Fluorescence Energy Transfer System between CdTe-Doped Silica Nanoparticles and Gold Nanoparticles		S7
Chemiluminescence	Bis (2,4,6-trichlorophenyl) oxalate-hydrogen peroxide-fluorescein and AuNPs	3 *10 ⁻¹³ mol/L.	S8
Visual detection	AuNPs	0.4 mg/L	S9

Table S2 Potable-instrument-based methods for detection melamine in milk samples.

Device name	System	Detection limit (nM)	Reference
Portable Raman instrument	gold nanoparticles	100-200 mg L ⁻¹	S11
Modified glucose Meter	DNA that is complementary to part of melamine aptamer	0.33 μM	S12
A mini-SPR based portable biosensor	anti-melamine antibody modification of surface of SPR	1.13 μg/mL	S13

Table S3 Measurement of melamine in milk sample using the device and HPLC.

HPLC (nM)	Proposed method (nM)	Recovery (%)	RSD (n=3,%)
675.3±18.7	800.0±13.8	118.5	3.6
987.3±60.1	1000.0±15.9	101.3	0.3

Reference

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