Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information (SI)

Smartphone-based gold nanoparticles colorimetric sensing platform for kanamycin detection in food samples

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Chemical and reagents

All reagents used in this assay were analytical reagent grade. High purity NaCl, KCl, $MgCl_2$, Na_2HPO_4, KH_2PO_4, acetic acid (CH_3COOH), trisodium citrate dihydrate ($C_6H_5Na_3O_7 \cdot 2H_2O$), and ethyl acetate ($C_4H_8O_2$) were purchased from Kelong Chemical Reagents (Chengdu, China). Gold chloride hydrate ($HAuCl_4 \cdot 3H_2O$) and trichloroacetic acid ($C_2HCl_3O_2$) were obtained from Aladdin Reagent Co. (Shanghai, China). Kanamycin solution, tetracycline, ampicillin trihydrate, tobramycin, gentamycin sulfate, chloramphenicol, chlortetracycline and Tris-HCl solution were ordered from Macklin Biochemical Co., Ltd (Shanghai, China).

The kanamycin aptamer: CCCCCATAACAAGAAAGCCAAACCTCTTGTTATGGGGGTTGAGGCTAAGC CGA was synthesized by Sangon Biotech Co., Ltd (Shanghai, China). Syringe filters were obtained from Tianjin Jinteng experimental equipment Co., Ltd. (Tianjin, China). Tris-HCl solution (10 mM Tris-HCl, 50 mM NaCl, 5 mM KCl, 5 mM $MgCl_2$, pH 7.4) was used as a working buffer. Water used in all experiments was purified by a water purification system (Chengdu Ultrapure Technology Co., Ltd. Chengdu, China) with a resistivity of 18.25 MΩ·cm. All solutions were stored at 4 ℃ in a refrigerator until use. The milk, honey, Vitamin C effervescent, vegetable, and meat were purchased from the local supermarket (Chengdu, China).

Instruments

Transmission electron microscope (TEM) imaging was performed on an FEI Tecnai F20 microscope. The UV-visible absorption was recorded with a T2602 II UV-visible

spectrophotometer (Shanghai, China). Photographs of the experimental results were taken and analyzed by Honor 20s.

Preparation of kanamycin aptamer

The untreated aptamer centrifuge tube was centrifuged for 10 min at 4000 rpm. Then add 97 uL of purified water to the centrifuge tube to prepare a 100 μM aptamer solution. Finally, the solution was diluted to 6 μM and was then refrigerated at 4 °C before use.

Preparation of AuNPs

The process involved heating $HAuCl_4$ (1 mM, 100 mL) to boiling under vigorous stirring. Trisodium citrate (38.8 mM, 10 mL) was then rapidly added to the boiling solution, resulting in a color change from pale yellow to dark red within 2 minutes. The mixture underwent reflux for an additional 20 minutes and was stirred while being progressively brought to room temperature. It was then refrigerated at 4°C until further use.

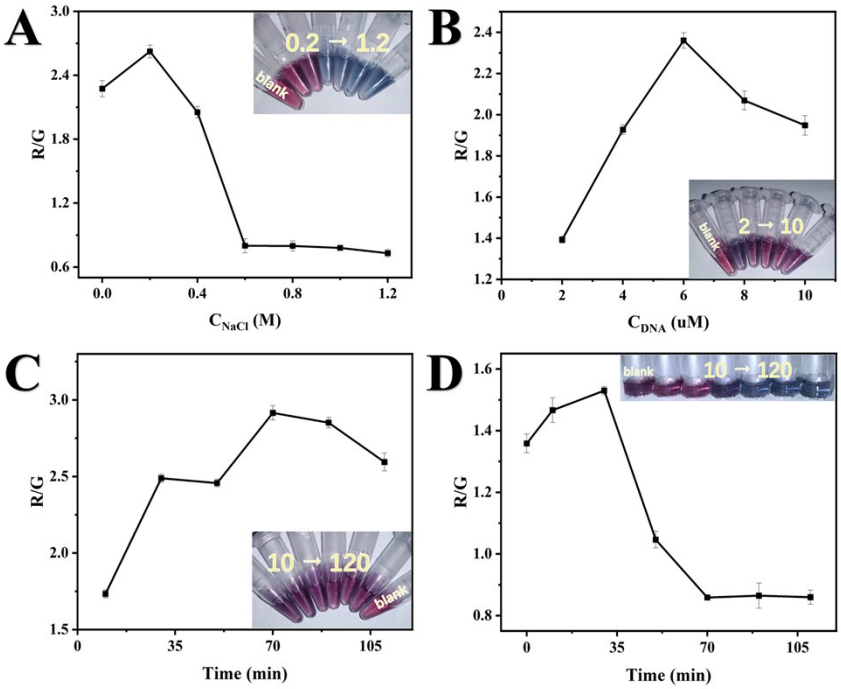

Figure. S1 (A) Optimization of the concentration of NaCl. (B) Optimization of the concentration of aptamer (C) Optimization of the incubation time of aptamer. (D) Optimization of the incubation time of Kana.

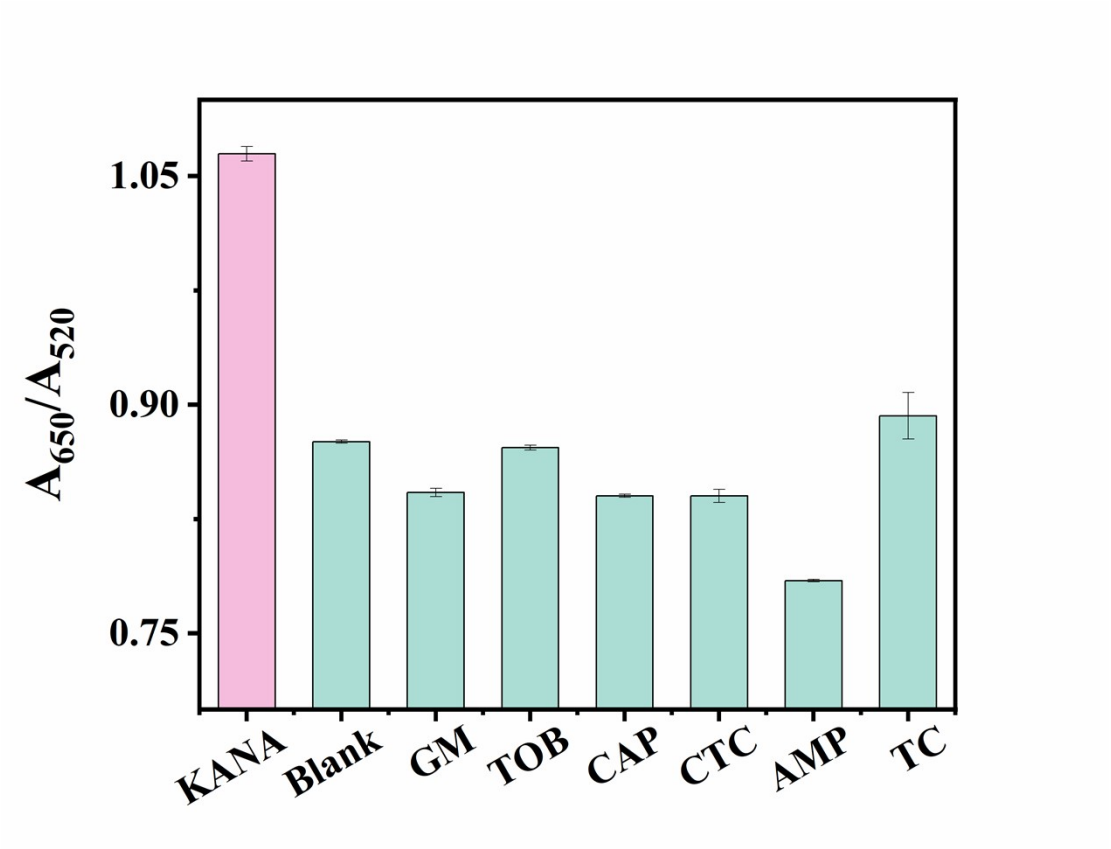

Figure. S2 Selectivity of the aptasensor for Kana detection in aqueous solution. The concentration of all substances was 3 nM.