Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

High sensitive detection of *Escherichia coli* based on the measurement of β-galactosidase activity by microchip capillary electrophoresis combined with field-amplified sample injection

Yan Zhang, Yating Zhang, Luqi Zhu, Pingang He, Qingjiang Wang*

School of Chemistry and Molecular Engineering, East China Normal University, 500 Dongchuan Road, Shanghai 200241, P. R. China

* Corresponding author

Tel.: +86 21 54340015. E-mail address: qjwang@chem.ecnu.edu.cn (Q.-J. Wang)

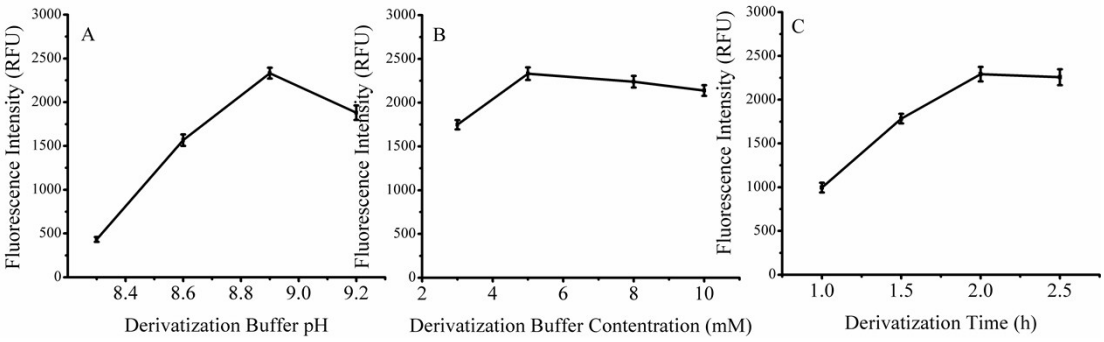

Fig. S1 Optimization of derivatization conditions. A. Influence of the derivatization buffer. The pH of derivatization buffer were 8.3, 8.6, 8.9, 9.2, respectively. B. Influence of the derivatization buffer concentration. The concentration of derivatization buffer were 3 mM, 5 mM, 8 mM, 10 mM, respectively. C. Influence of the derivatization time. The time of derivatization reaction was 1.0 h, 1.5 h, 2.0 h, 2.5 h, respectively. The concentration of PAP in each condition both was 3 μM.

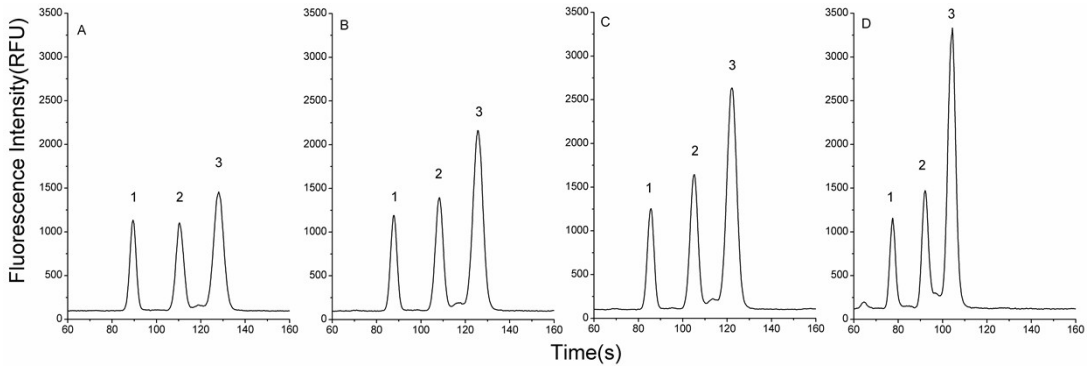

Fig. S2 Influence of the running buffer pH on separation. The pH of running buffer: A. 8.4, B. 8.7, C. 9.0, and D. 9.3. The concentrations of both PAPG and PAP were 2 μM. Derivatization conditions: FITC: PAPG/PAP =3:1 (molar ratio), 5 mM borate buffer solution (pH 8.9), reaction time: 2 h at 40°C. The samples were prepared in 5 mM borate solution (pH 8.9). The running buffer was 60 mM borate solution. Peak identifications: 1. PAPG-FITC; 2. PAP-FITC; 3. FITC.

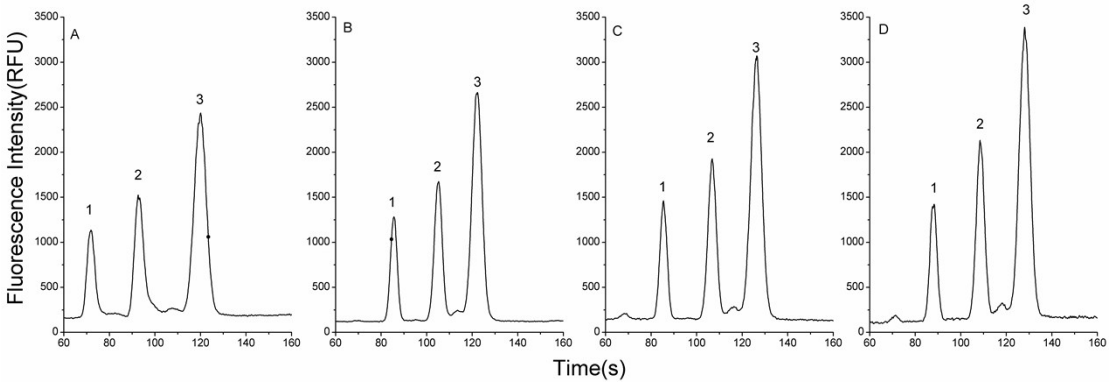

Fig. S3 Influence of the running buffer concentration on separation. The concentration of running buffer: A. 40 mM, B. 50 mM, C. 60 mM, and D. 70 mM. The concentrations of PAPG and PAP were 2 μM. Derivatization conditions were the same as those in Fig. S2. The samples were prepared in 5 mM borate solution (pH 8.9). The pH of the running buffer was 9.0. Peak identifications: 1. PAPG-FITC; 2. PAP-FITC; 3. FITC.

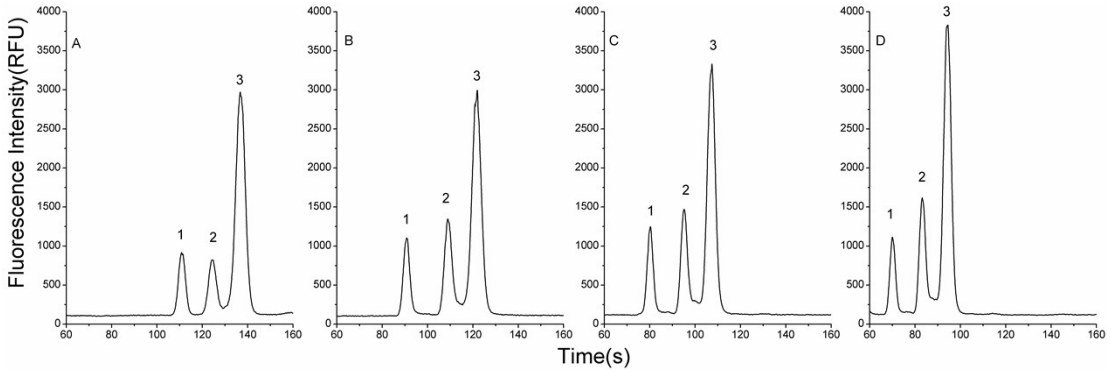

Fig. S4 Influence of voltage on separation. The separation voltage: A. 1.2 kV, B. 1.5 kV, C. 1.8 kV, and D. 2.0 kV. The concentrations of PAPG and PAP were 2 μM. Derivatization conditions were the same as those in Fig. S2.

The samples were prepared in 5 mM borate solution (pH 8.9). The pH of the running buffer was 9.0, and the borate concentration was 60 mM. Peak identifications: 1. PAPG-FITC; 2. PAP-FITC; 3. FITC.

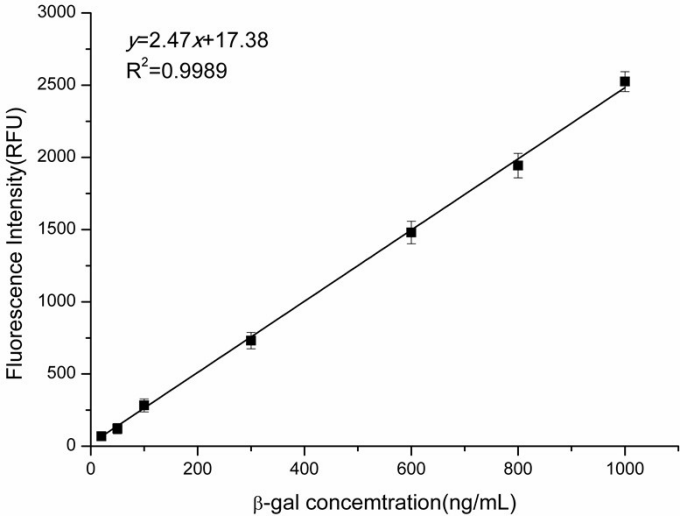

Fig. S5 Calibration plot of the fluorescence intensity of PAP derivative *vs.* β-gal concentration.

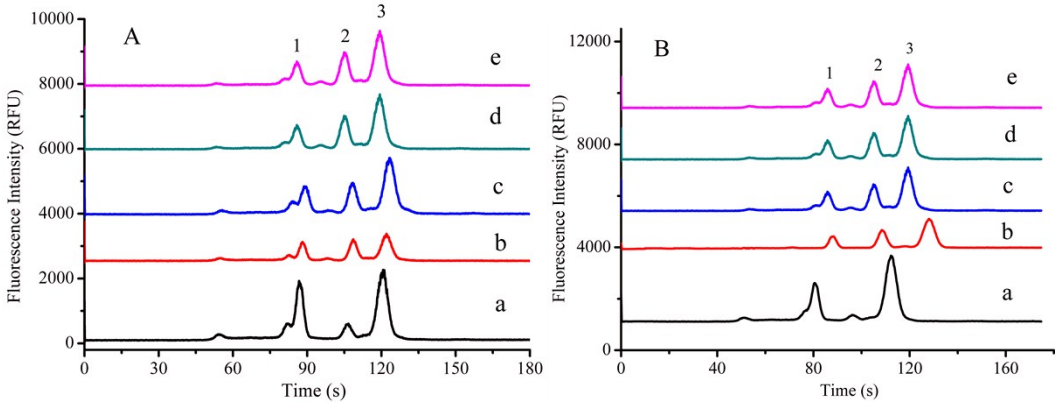

Fig. S6 A. Effect of IPTG concentration on the detection of *E. coli* (200 CFU mL^{-1}). B. Effect of Triton X 100 concentration on the detection of *E. coli* (200 CFU mL^{-1}).