Supporting Information

A capillary-based centrifugal indicator equipped with in-situ pathogenic bacteria culture for fast antimicrobial susceptibility testing

Longyu Chen [a], Meijia Zhu [a], Zhiyong Wang [b], Hongliang Wang [c], Yongqiang Cheng [a*], Ziwei Zhang [a], Xiaoxiao Qi [a], Yifan Shao [a], Xi Zhang [a], Hongwei Wang [d]

[a] Institute of Eco-Environmental Forensics，Qingdao Institute of Humanities and Social Sciences, Shandong University

[b] China Academy of Building Research, Beijing, 100013, China

[c] National Deep Sea Center, Qingdao 266237 , China

[d] Department of Clinical Laboratory, The Affiliated Hospital of Qingdao University, Qingdao, Shandong 266003，China.

[*]**Corresponding author:** Yongqiang Cheng

Institute of Eco-Environmental Forensics, Shandong University (Qingdao), No. 72, Binhai Road, Jimo District, Qingdao, Shandong Province, 266237, China.

Email: chengyongqiang@sdu.edu.cn

Fig. S1 Calibration curve relating the concentrations of *E. coli* to the optical densities at 600 nm (OD_{600}).

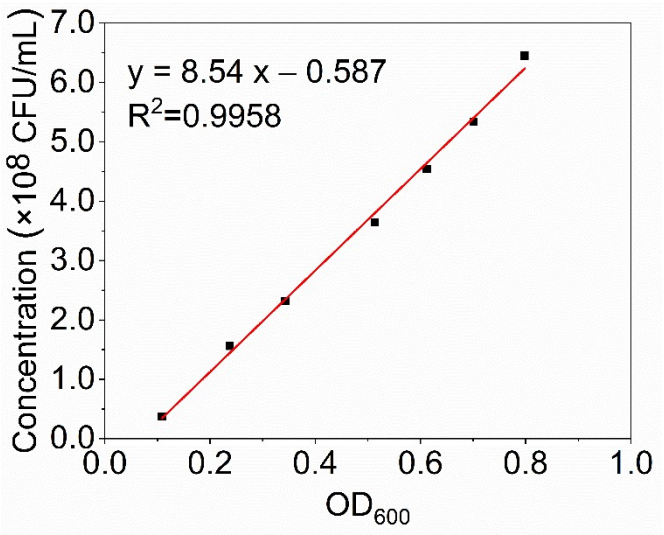

Table S1 The concentration gradient of antibiotics for three bacteria in clinical urine.

	Concentration gradient of antibiotics		
Antibiotics	***Escherichia coli***	***Klebsiella pneumoniae***	***Acinetobacter pittii***
Amikacin	0, 0.25, 0.5, 1, 2, 4, 8, 16 μg/mL	0, 0.25, 0.5, 1, 2, 4, 8, 16μg/mL	0, 0.25, 0.5, 1, 2, 4, 8, 16 μg/mL
Tobramycin	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL
Levofloxacin	0, 0.125, 0.25, 0.5, 1, 2, 4, 8 μg/mL	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL
Ampicillin	0, 1, 2, 4, 8, 16, 32, 100 μg/mL	/	/
Gentamycin	/	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL	/
Meropenem	/	/	0, 0.5, 1, 2, 4, 8, 16, 32 μg/mL

Table S2 The heights obtained by centrifugation at different incubation time in *E. coli* ATCC 25922 AST. The error bars represent the standard deviation (n = 3).

Incubation time	2 h		2.5 h		3 h		3.5 h	
Concentration of ampicillin	**Average height (mm)**	**Errors**	**Average height (mm)**	**Errors**	**Average height (mm)**	**Errors**	**Average height (mm)**	**Errors**
0 μg/mL	0.63	0.09	1.34	0.05	1.98	0.11	2.79	0.14
1 μg/mL	0.45	0.06	1.07	0.06	1.78	0.07	2.68	0.07
2 μg/mL	0.37	0.04	1.01	0.05	1.74	0.05	2.53	0.08
4 μg/mL	0.21	0.03	0.51	0.03	1.65	0.04	2.38	0.07
8 μg/mL	/	/	0.06	0.06	0.13	0.06	0.23	0.06
16 μg/mL	/	/	/	/	/	/	0.13	0.08
32 μg/mL	/	/	/	/	/	/	/	/
100 μg/mL	/	/	/	/	/	/	/	/

Table S3 The AST results comparison for three clinical urine samples based on the CBCI system and the clinical standard methods. S, susceptible; I, intermediate; R, resistant.

Urine samples	**Sample 1**			**Sample 2**			**Sample 3**		
	E. coli			***Klebsiella pneumoniae***			***Acinetobacter pittii***		
Antibiotics	CBCI system	Clinical methods	Comparison	CBCI system	Clinical methods	Comparison	CBCI system	Clinical methods	Comparison
Amikacin	≤2	≤2	S/S	≤2	≤2	S/S	≤2	≤2	S/S
Tobramycin	16	≥16	R/R	8	8	I/I	≤2	≤1	S/S
Levofloxacin	1	1	I/I	1	1	I/I	≤0.25	≤0.12	S/S
Ampicillin	≥100	≥32	R/R	/	/	/	/	/	/
Gentamycin	/	/	/	≥32	≥16	R/R	/	/	/
Meropenem	/	/	/	/	/	/	≤0.25	≤0.25	S/S

Specific information on the three clinical samples obtained from the inspection report is as follows: Sample 1 was diagnosed with a UTI and the pathogen identified was *Escherichia coli* ($\geqslant 10^5$ CFU/mL)；Sample 2 was diagnosed with a febrile infection and the pathogen identified was *K. pneumoniae* ($\geqslant 10^5$ CFU/mL)；Sample 3 was diagnosed with an elevated prostate specific antigen (PSA) and the pathogen identified was *Acinetobacter pittii* ($\geqslant 10^5$ CFU/mL). Urine culture bacterial colony counts $\geq 10^5$ CFU/mL is diagnosed as UTIs, and the above three samples were UTIs.