

Supplementary Materials

Electroanalytical Platform for Rapid *E. coli* O157:H7 Detection in Water Samples

Kundan Kumar Mishra¹, Vikram Narayanan Dhamu², Chesna Jophy¹,

Sriram Muthukumar², Shalini Prasad^{1,2*}

¹Department of Bioengineering, University of Texas at Dallas, Richardson, TX 75080, USA,

²EnLiSense LLC, 1813 Audubon Pondway, Allen, TX 75013, USA.

Corresponding email: shalini.prasad@utdallas.edu

Table S1. Comparison of the developed immunosensor with other, studied, label-free detection methods of *E. coli* O157:H7.

Immunosensor/Device	Sample Type	LoD (CFU/mL)	Linear Range (CFU/mL)	Assay Time (min)	Reproducibility	Sensitivity	Selectivity (Cross reactivity)	Ref.
DPV	Licorice extract	80	5×10^2 – 5×10^7	150	RSD <5%	0.368 mA/CFU/mL	–	[1]
CV–DPV	Water	17	1.7×10^1 – 1.1×10^7	35	–	–	<20% against <i>Salmonella typhimurium</i>	[2]
DPV	Spring water and milk	34	7.8×10^1 – 7.8×10^6	150	RSD <3.4%	–	<15% against <i>Salmonella</i> , <i>E. coli</i> DH5 α , and <i>E. coli</i> O149	[3]
DPV-EIS-CV	Water	2	2.1×10^1 – 2.1×10^7	20	RSD = 6.01%	–	20% and 30 % against <i>Salmonella typhimurium</i> and <i>Pseudomonas aeruginosa</i>	[4]
CV	Urine and water	4	4 – 10^6	70	%CV = 3.2 % and 6.3 %	353.17 mA/CFU/mL	<20% against <i>Proteus mirabilis</i> , <i>Enterococcus faecalis</i> , <i>Staphylococcus haemolyticus</i> , and <i>Pseudomonas aeruginosa</i>	[5]
EIS	Drinking water	75	1.0×10^2 – 1.0×10^5	70	RSD = 4.8%	6094 mA/CFU/mL	24.3 % and 17.9% against <i>E. coli</i> DH 5 and Gram-positive <i>M. luteus</i>	[6]
CV–CA	Beef and water	309	10^2 – 10^5	70–90	%CV = 6.7%	–	<25% against <i>Salmonella typhimurium</i>	[7]
CV	Ground beef	52	10^1 – 10^6	60	–	18.80 mA/CFU/mL	<17% against <i>Salmonella typhimurium</i> and <i>E. coli</i> K12	[8]
CV	PBS buffer	30	3×10^1 – 3×10^7	–	RSD = 8.9%	2.78 mA/CFU/mL	<15% against <i>E. coli</i> O124, <i>P. aeruginosa</i> , and <i>S. enteritidis</i>	[9]
EIS	Potable water	1	10 – 10^5	5	%CV <20% intra-assay variation and inter-assay variation	1453 Ω /CFU/mL	10–16% against <i>Salmonella typhimurium</i>	This work

DVP—Differential pulse voltammetry; CV—cyclic voltammetry; CA—chronoamperometry; EIS—electrochemical impedance spectroscopy; RSD—relative standard deviation; CV—coefficient of variation.

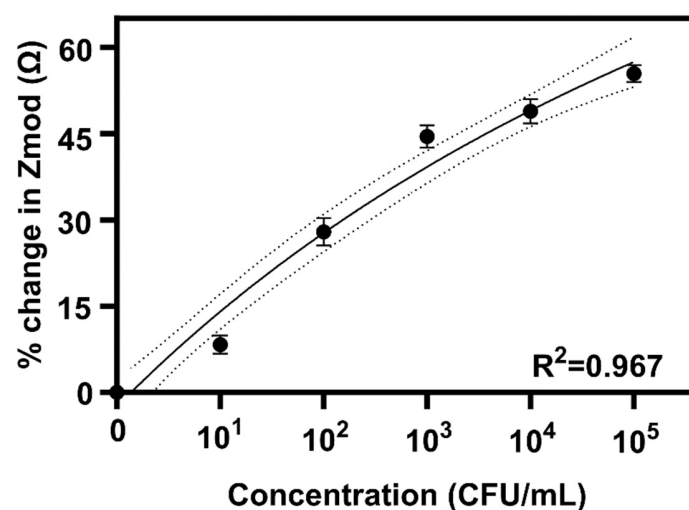


Figure S1. A calibration dose–response study was performed on the sensor platform for *E. coli* O157:H7 in potable water, covering spiked dose concentrations ranging from ZD to 10⁵ CFU/mL.

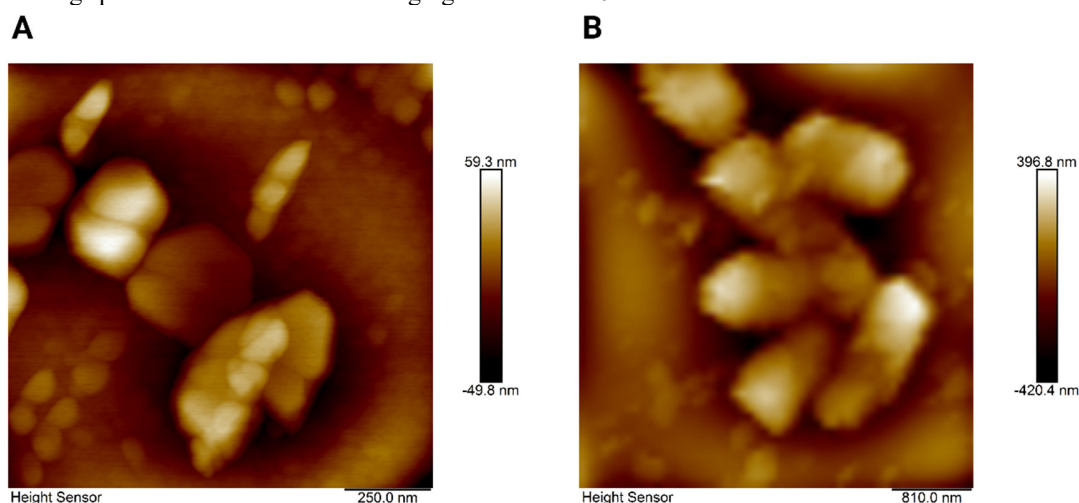


Figure S2. (A) Atomic force microscopy (AFM) images showing the presence of antibodies (300–450 nm) on the sensor platform. (B) Sensor surface after exposure to *E. coli*, with *E. coli* bacteria measuring 1.5 to 2 μm, confirming their presence on the sensor surface.

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