EDS|New Sample|Area 1000|Live Map 1

kV:15   Mag:89   Takeoff: 30.33   Live Time : 290   Amp Time(µs) : 3.84   Resolution:(eV) : 128.3
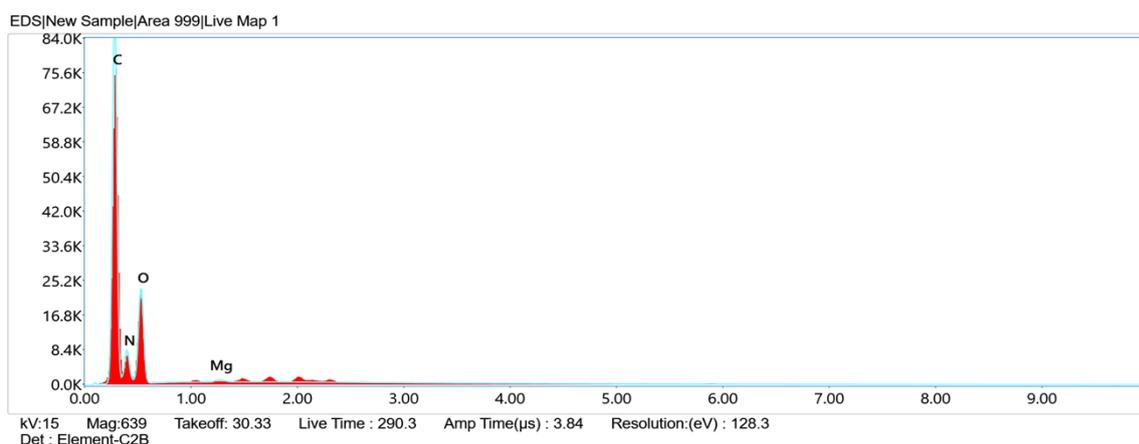Det : Element-C2B

Figure S1. EDS spectrum of E. coli sample alone

Table S1. Detailed elemental composition of E. coli sample alone

Element	Weight %	MDL	Atomic %	Error %	Net Int.	R	A	F
C K	9.1	0.21	14.0	11.7	47.0	0.9103	0.0720	1.0000
O K	52.2	0.01	60.4	9.1	2101.7	0.9213	0.2243	1.0000
Na K	8.4	0.03	6.7	7.8	581.7	0.9337	0.3769	1.0045
Al K	2.2	0.02	1.5	5.8	262.0	0.9411	0.6113	1.0140
Si K	22.3	0.02	14.7	4.4	2833.9	0.9445	0.7062	1.0039
K K	4.0	0.04	1.9	3.2	275.7	0.9594	0.9018	1.0165
Ti K	1.8	0.06	0.7	4.1	80.9	0.9673	0.9535	1.0304

EDS|New Sample|Area 999|Live Map 1

kV:15   Mag:639   Takeoff: 30.33   Live Time : 290.3   Amp Time(µs) : 3.84   Resolution:(eV) : 128.3
Det : Element-C2B

Figure S2. EDS spectrum of E. coli adsorbed on MAN-GO

Table S2. Detailed elemental composition of E. coli adsorbed on MAN-GO

Element	Weight %	MDL	Atomic %	Error %	Net Int.	R	A	F
C K	62.0	0.05	67.3	8.5	1893.8	0.9407	0.2824	1.0000
N K	15.0	0.17	14.0	11.5	170.3	0.9452	0.0553	1.0000
O K	23.0	0.06	18.7	10.6	591.4	0.9487	0.0956	1.0000

Table S3. The comprehensive parameters derived from the BET analysis of the MAN-GO

Slope (Linear)	**2.996**
Intercept (Linear)	0.001
Correlation coefficient	0.995
Vm	0.333 [cm^3(STP) g^{-1}]
as, BET	1.452 [m^2 g^{-1}]
C	2910.5
Total pore volume(p/p0=0.982)	0.025 [cm^3 g^{-1}]
Mean pore diameter	70.047 [nm]

composite

Table S4. The comprehensive parameters derived from the BET analysis of the GO composite

Slope (Linear)	**0.297**
Intercept (Linear)	0.003
Correlation coefficient	0.998
Vm	3.328 [cm^3(STP) g^{-1}]
as, BET	14.487 [m^2 g^{-1}]
C	93.137
Total pore volume(p/p0=0.982)	0.122 [cm^3 g^{-1}]
Mean pore diameter	33.746 [nm]

**Table S5.** The comprehensive parameters derived from the BET analysis of the E. coli

Slope (Linear)	**1.740**
Intercept (Linear)	0.0216
Correlation coefficient	0.995
Vm	0.567[cm^3(STP) g^{-1}]
as,BET	2.469 [m^2 g^{-1}]
C	81.423
Total pore volume(p/p0=0.982)	0.012[cm^3 g^{-1}]
Mean pore diameter	20.291 [nm]

adsorbed GO composite

Table S6. The comprehensive parameters derived from the BET analysis of the E. coli adsorbed MAN-GO composite

Slope (Linear)	**0.437**
Intercept (Linear)	0.010
Correlation coefficient	0.999
Vm	2.233 [cm^3(STP) g^{-1}]
as, BET	9.721[m^2 g^{-1}]
C	43.341
Total pore volume(p/p0=0.982)	0.051[cm^3 g^{-1}]
Mean pore diameter	20.998 [nm]

Table S7. Composition of each group (1–18) shown in the fluorescence interference study. Each entry includes MAN-GO alone and in combination with E. coli and the respective analyte/interferent used to assess the selectivity and specificity of the sensing system

1	
2	NaCl
3	KCl
4	LiCl
5	Co^{2+}
6	Urea
7	Citric acid
8	Sn^{2+}
9	Al^{3+}
10	Pb^{2+}
11	Hg^{2+}
12	Cd^{2+}
13	Fe^{2+}
14	Ag^{2+}
15	Ce^{2+}
16	Cu^{2+}
17	Glucose
18	Phosphate
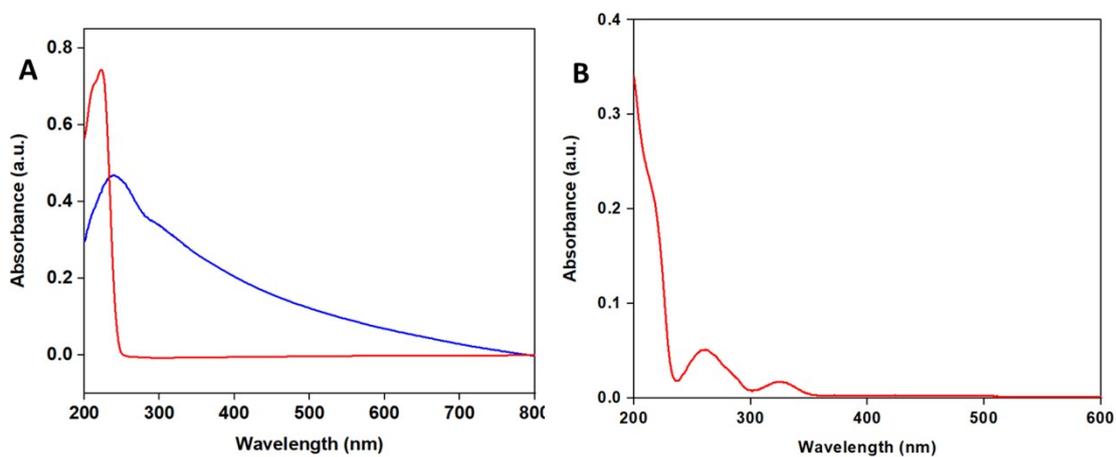
Figure S3. UV–visible absorption spectra of (A) GO (blue) and MAN–GO (red), showing distinct π–π* and n–π* transitions, confirming successful mannose functionalization, and (B) E. coli dispersion in PBS, recorded as control to verify possible inner filter effect (IFE).
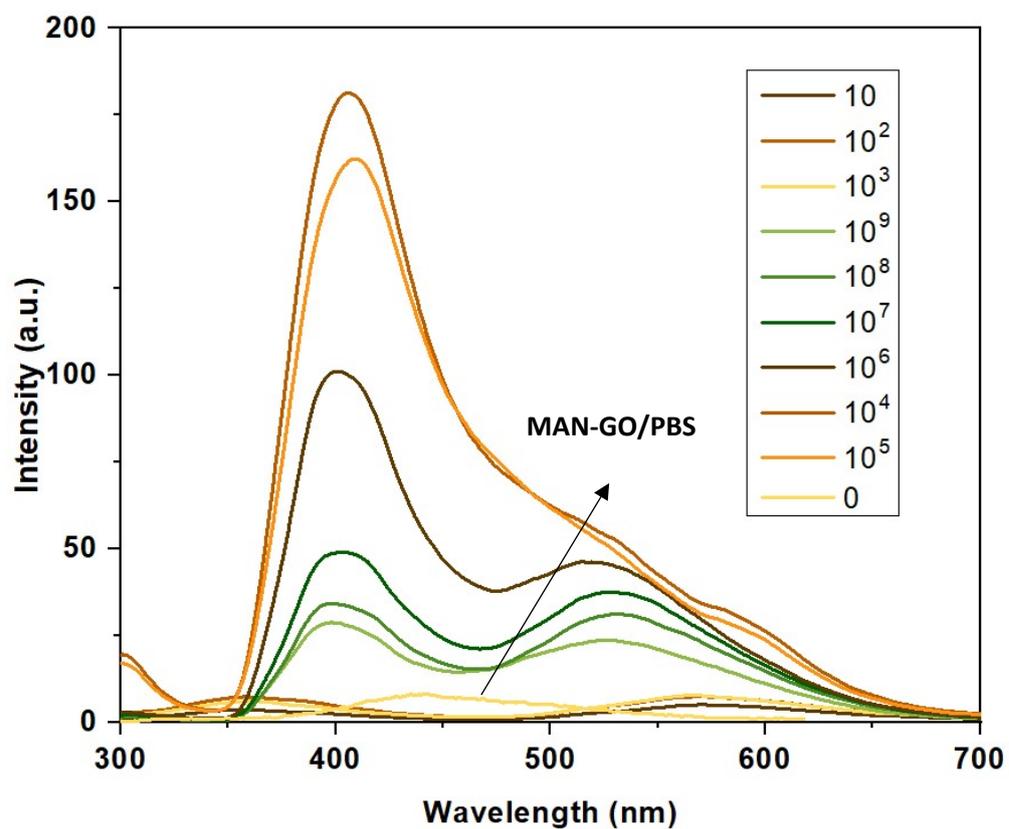
Figure S4. Performance evaluation of the sensor system for E. coli detection. (A) Effect of varying E. coli concentration on fluorescence intensity from 0 to 10^9