Supporting information

One-step synthesis of amikacin modified fluorescent carbon dots for the detection of Gram-negative bacteria like *Escherichia coli.*

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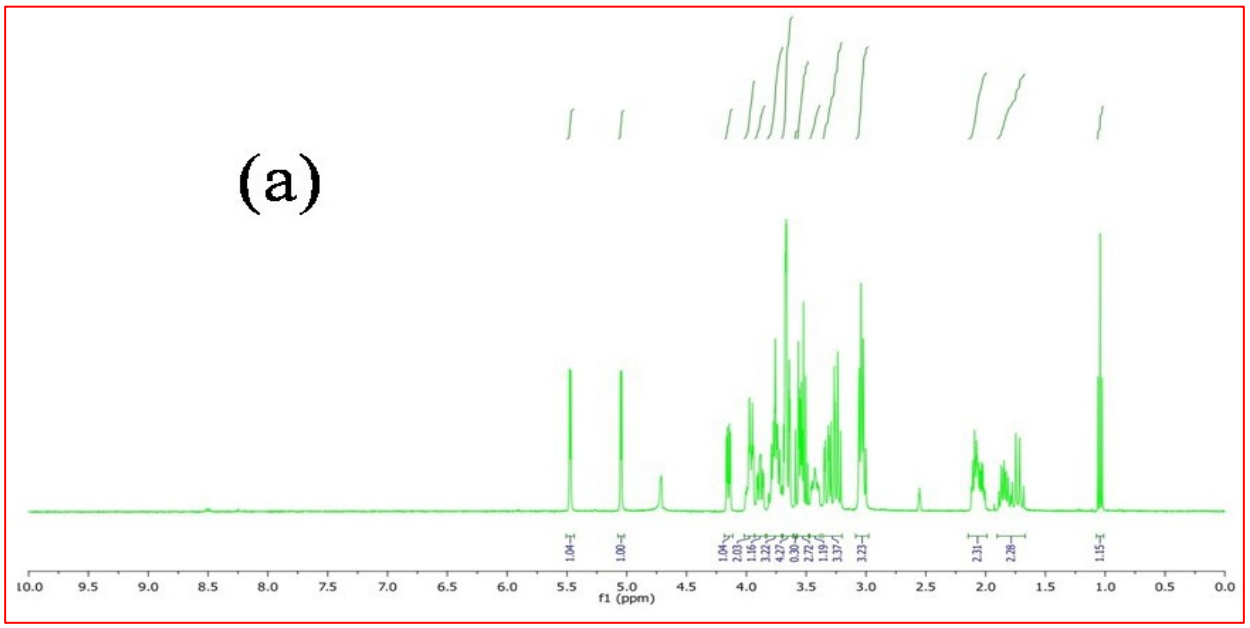
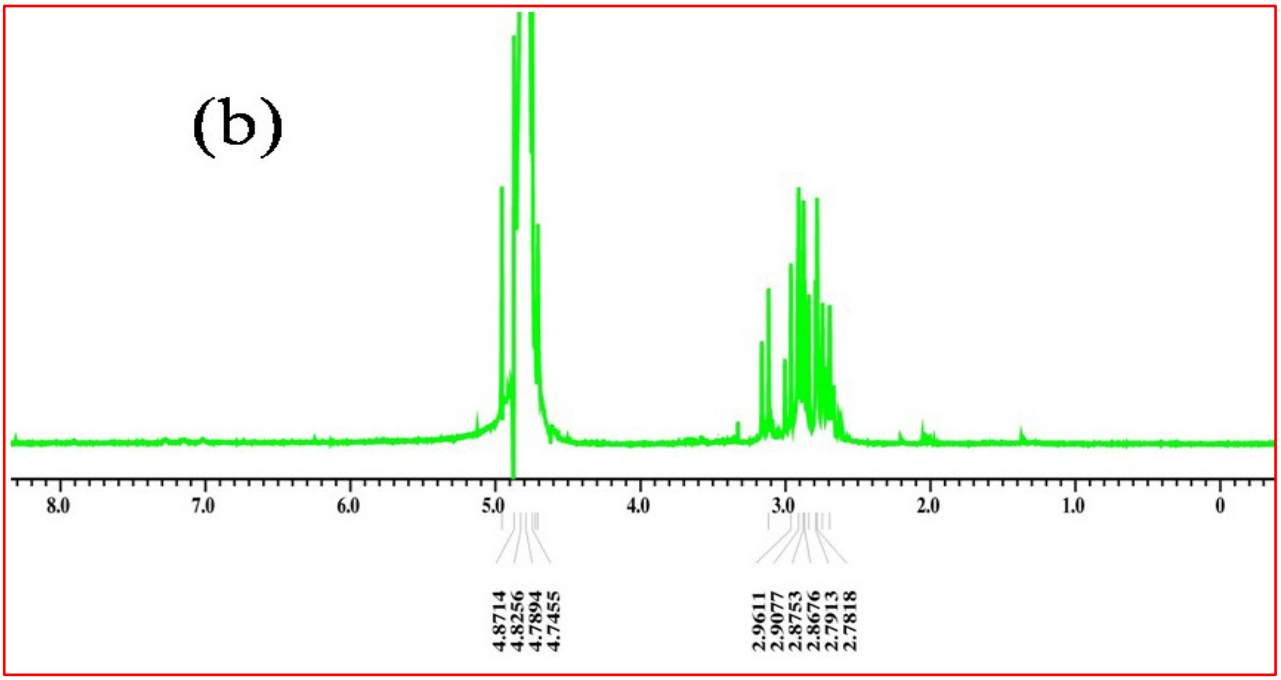
Note added after first publication: This Supplementary Information file was updated on 13 February 2018, replacing that originally published on 25 July 2016, in which an incorrect image was included in Fig. S7 (b).


(a)
f1 (ppm)


(b)
4.8714
4.8256
4.7894
4.7455
2.9611
2.9077
2.8753
2.8676
2.7913
2.7818

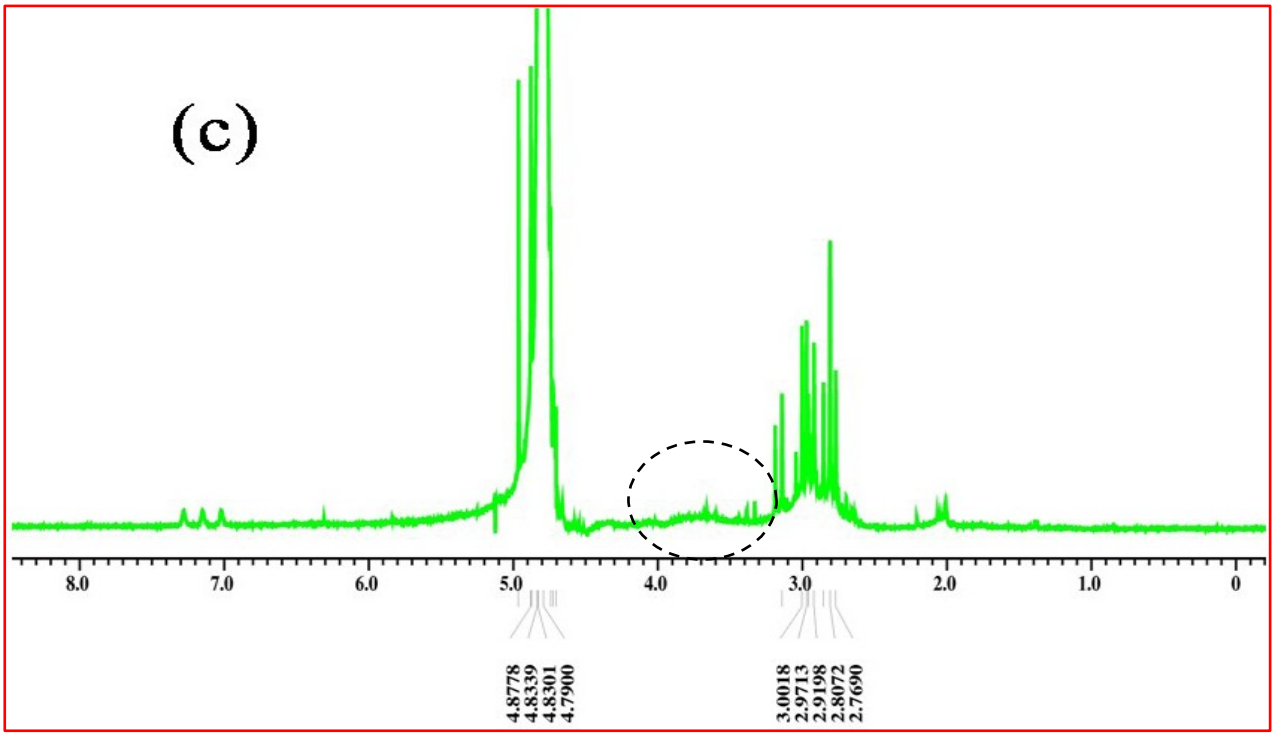


Fig.S1: [1] HNMR of amikacin (a); CDs (b) and CDs@amikacin-1(c).

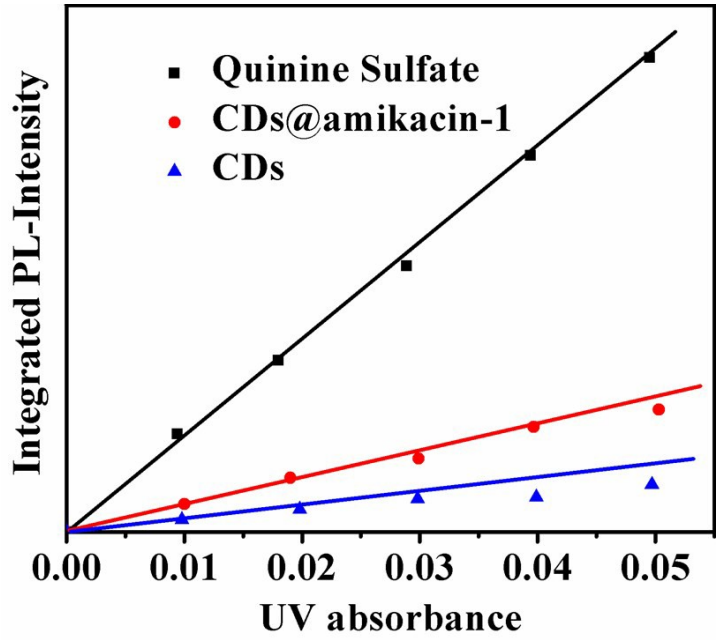


Fig.S2: Integrated fluorescence intensity versus UV-absorbance plot of the CDs@amikacin-1, CDs and Quinine Sulfate.

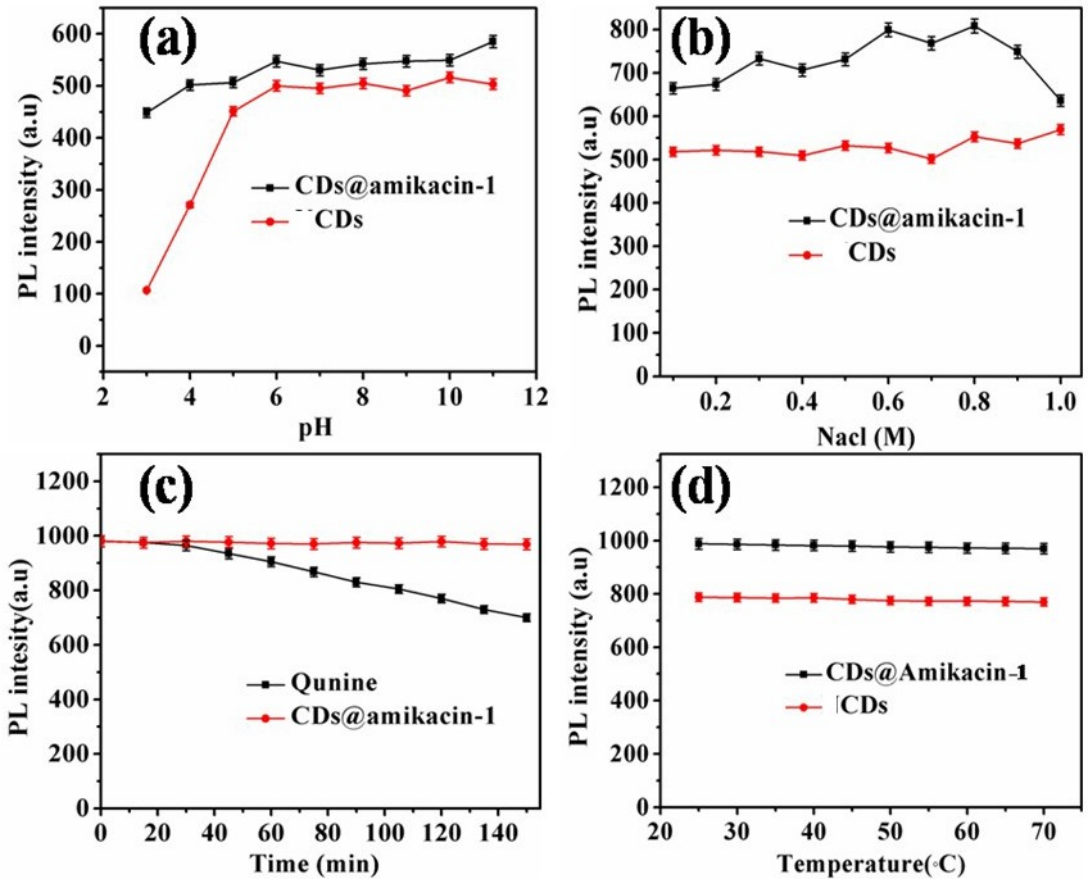


Fig.S3:(a) Effect of pH on the fluorescence intensity of CDs@amikacin-1 and CDs;(b) Effect of ionic strengths on the fluorescence intensity of CDs@amikacin-1 and CDs (ionic strengths were controlled by various concentrations of NaCl); (c) Change in fluorescence intensity of the CDs@amikacin-1 and commercial dye quinine with respect to time of irradiation of UV light radiation; (d) Change in fluorescence intensity of the CDs@amikacin-1 and CDs with increasing temperature.

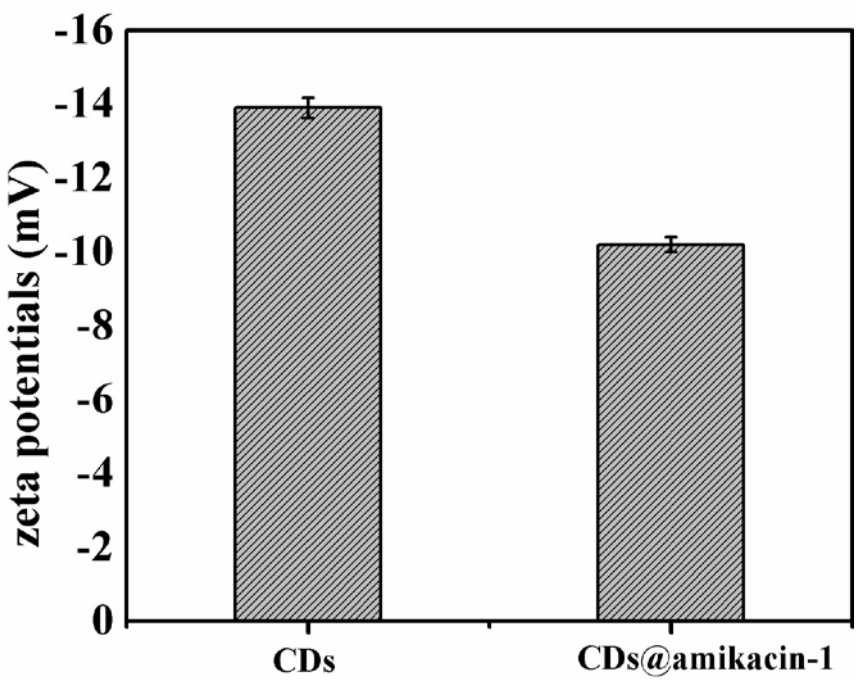


Fig. S4: Zeta potential of CDs@amikacin-1 and CDs at pH 7.

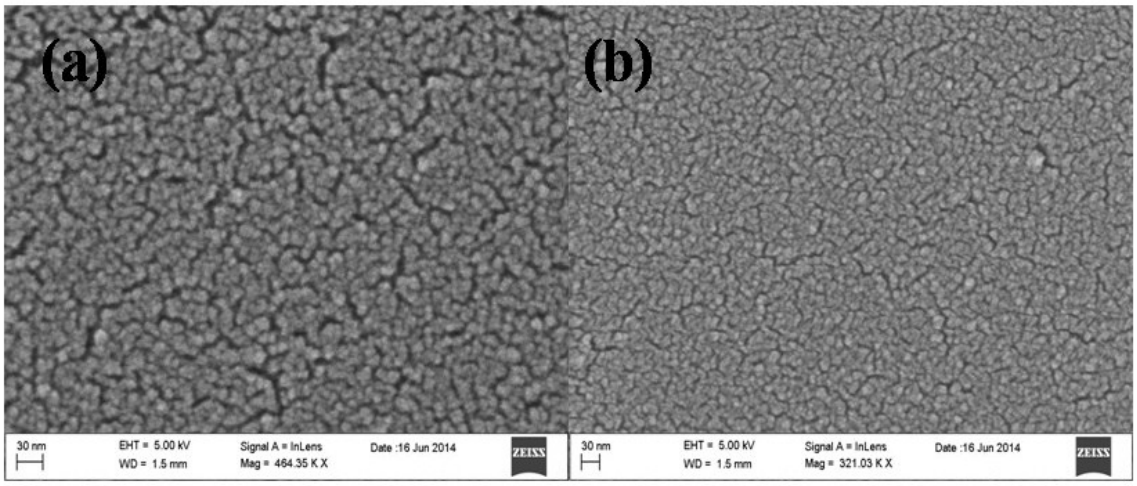


Fig.S5: FESEM image of the CDs@amikacin-1 (a) and CDs (b).

Fig. S6: EDX spectra and elemental composition of the as synthesised (a) CDs and (b) CDs@amikacin-1.

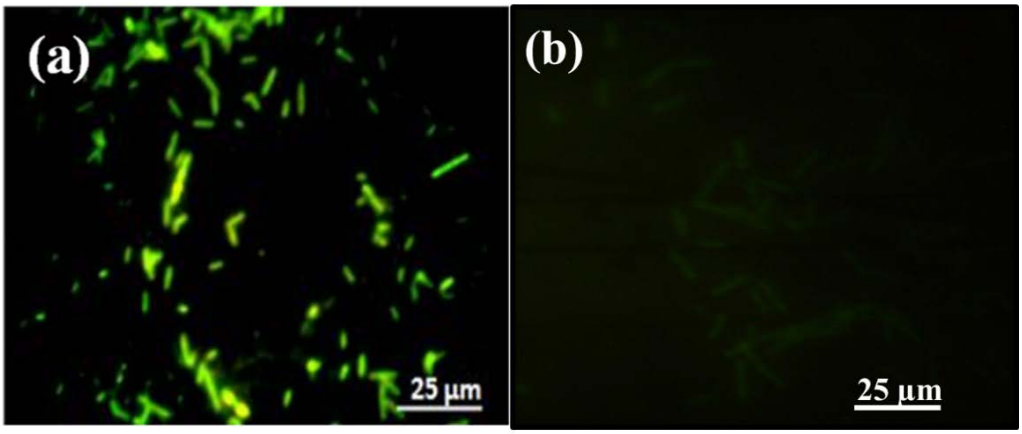


Fig.S7: Fluorescent image of *E. coli.* labeled with (a) CDs@amikacin-1 and (b) CDs@amikacin-2.

To examine the CDs attachment on the bacterial cells, CDs@amikacin-1 and CDs@amikacin-2 was incubated with *E. coli.* The *E. coli* concentration was adjusted to 10^6 cfu/mL. Each culture was incubated in a shaking incubator at 37 °C for overnight. The *E. coli* were washed twice with phosphate buffered saline to remove any unutilized CDs. The fluorescence intensity of CDs@amikacin-1 and CDs@amikacin-2 was analyzed under fluorescent microscope for detection of fluorescence intensity in bacterial cells. The fluorescent images revels that *E. coli.* labeled with, CDs@amikacin-1 has higher fluorescence intensity in compared to *E. coli.* labeled with, CDs@amikacin-2, as shown in the Fig.S7.

Table 1: Comparative study for LOD values and linear ranges with our work and other previously reported work for *E.Coli* detection.

References	LOD(cfu/mL)	Linear range(cfu/mL)
[1]	$3.5x10^2$	$3.5x10^2$-$2.9x10^3$
[2]	$9.5x10^4$	10^5-10^8
[3]	$4.5x10^2$	10^3-10^8
Our work	$5.52x10^2$	$7.625x10^2$-$3.904x10^5$

References:

1. M. L. Bhaisare, G. Gedda, M. S. Khan and H-F. Wu, *Analytica Chimica Acta*, 2016,**920**, 63-71.

2. N. Wang, Y.Wang, T. Guo, T.Yang, M.Chen and J.Wang, *Biosensors and Bioelectronics*, 2016, **85**, 68–75.

3. C-I. Weng, H-T. Chang, C-H. Lin, Y-W. Shen, B. Unnikrishnan, Y-J. Li, C-C. Huang, *Biosensors and Bioelectronics*, 2015, **68**, 1–6.