Construction of portable electrochemical immunosensor based on the graphene hydrogel@polydopamine for microcystin-LR detection by using multi-mesoporous carbon spheres-enzyme label

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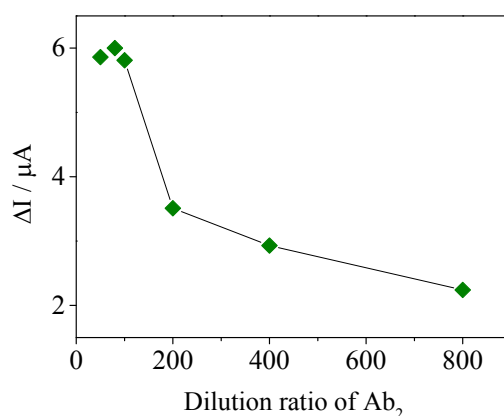
Fig. S1 Effect of the dilution ratio of Ab_2.

Estimation of detection limit

According to the international union of pure and applied chemistry (IUPAC) (Fassel. 1978), the limit of detection (LOD), expressed as the concentration, c_L, is derived from the value calculated by the calibration plot obtained from a given analytical procedure where $x_L = x_{b1} + 3s_{b1}$, where x_L is the smallest measure, x_{b1} is the mean signal of the blank measures and s_{b1} is the standard deviation of the blank measures. In this work, after making twelve measurements of blank, the $x_{b1}= 23.33$ and $s_{b1} = 0.12$ was obtained. Therefore, $x_L = x_{b1}+3s_{b1}=23.33+3×0.12=23.69$. The calibration plot of this proposed immunosensor is $\Delta I =8.21−7.69×lgC_{MC-LR}$. Therefore, the $c_L=10^{(\Delta I-8.21)/(-7.69)}=10^{(23.69−8.21)/(-7.69)}=0.0097 \, \mu g/L= 9.7 \, ng/L$ (Ren et al. 2015), where ΔI is the x_L at 23.69. In conclusion, the LOD of this proposed immunosensor for the detection of MC-LR is 9.7 ng/L.

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Table S1 Comparison with other reported analysis method of MC-LR

Method	Linear range	Detection limit	Ref.

	(μg/L)	(μg/L)	
Phosphatase inhibition assay	0.4-10	0.2	[1]
LC-MS	0.01-2.5 μg/g	0.005 μg/g	[2]
ELISA	0.3-10	0.1	[3]
Apatmer sensor	0.05-100 [a](1.0×10^{-7}-5.0×10^{-11} mol/L)	0.018 [a] (1.8×10^{-11} mol/L)	[4]
Label-free immunosensor	0.05-15	0.02 [a] (20 ng/L)	[5]
Graphene immunosensor	0.05-15	0.016	[6]
Fluorescence immunosensor	0.02-16 [a] (0.02-16 ng/mL)	0.007 [a] (0.007 ng/mL)	[7]
Electrochemical immunosensor	0.05-20	0.03	[8]
Immunosensor	0.01-10	0.0097	This work

[a] the data is from the original work.

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