SUPPORTING INFORMATION

Carbon dot-modified silver nanoparticle electrochemical sensor for ultrasensitive detection of total malachite green and leucomalachite green residues in fish.

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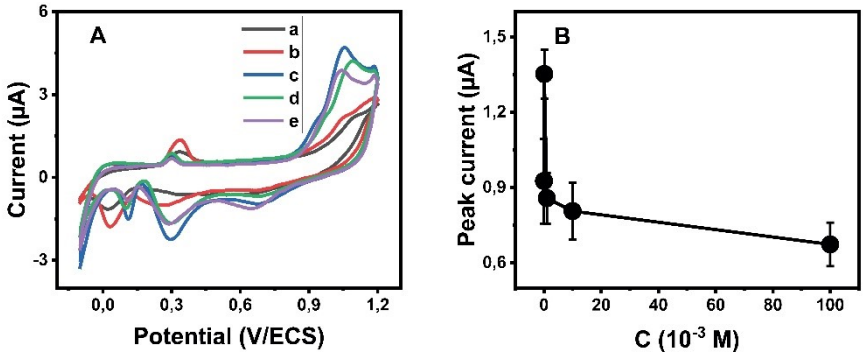

Fig. S1 A) Cyclic voltammograms of AgCQDs/Au in the presence of (a) 10^{-5} M; (b) 10^{-4} M; (c) 10^{-3} M; (d) 10^{-2} M and (e) 10^{-1} M of Na_2SO_4 with 2.5 ng/mL of each MG and LMG in their mixture at 50 mV/s. B) Intensity of the oxidation current peak as a function of Na_2SO_4 concentration.

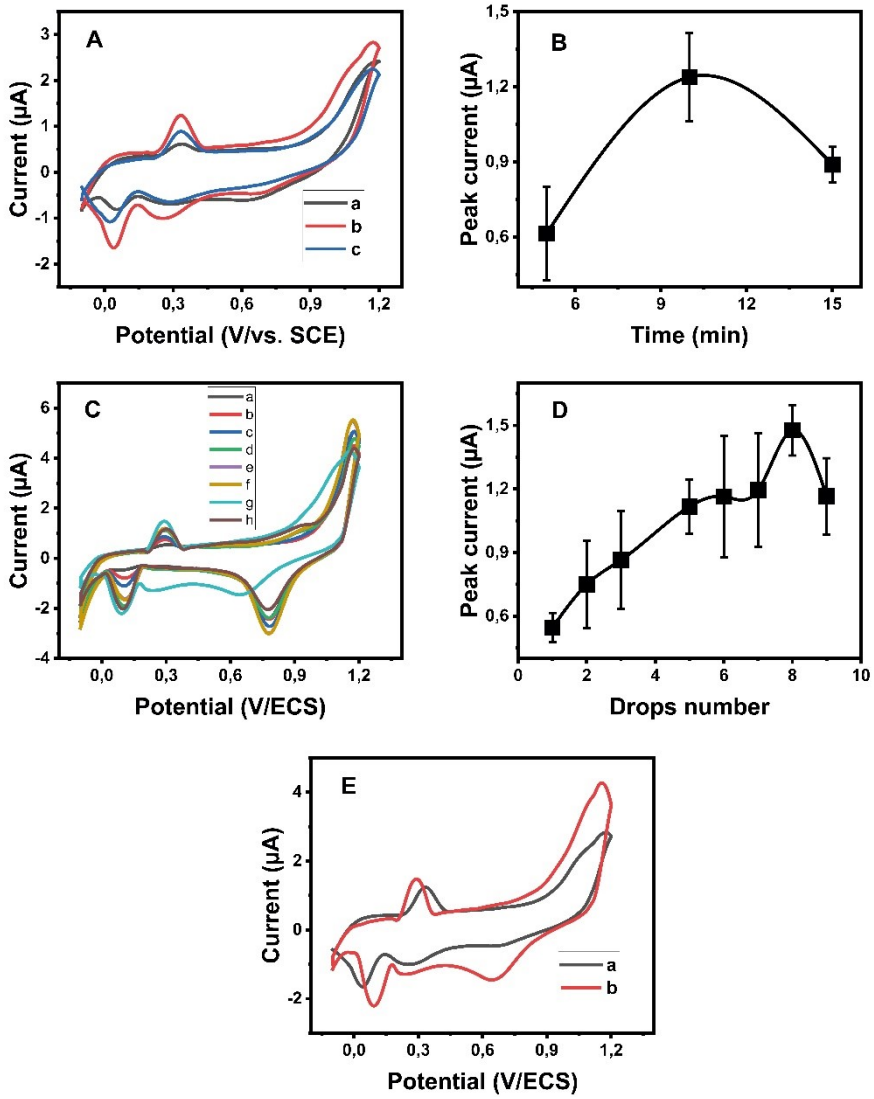

Fig. S2: A) Cyclic voltammograms recorded in 10^{-4} M Na_2SO_4 solution at 50 mV/s in the presence of 2.5 ng/mL of each MG and LMG in their mixture at different immersion times of the Au electrode in the colloidal solution of AgCDs. B) Peak current intensity as a function of immersion time (a) 5, (b) 10 and (c) 15 min. C) Cyclic voltammograms recorded in 10^{-4} M Na_2SO_4 solution at 50 mV/s in the presence of 2.5 ng/mL of each MG and LMG in the mixture for different number of drops of colloidal AgCDs solution on the surface of the Au electrode. D) Peak current intensity as a function of the number of droplets deposited from (a) 1 drop to (h) 8 drops. E) Superposition of the voltammograms obtained for (a) 10 min of immersion and (b) deposition of 8 drops.

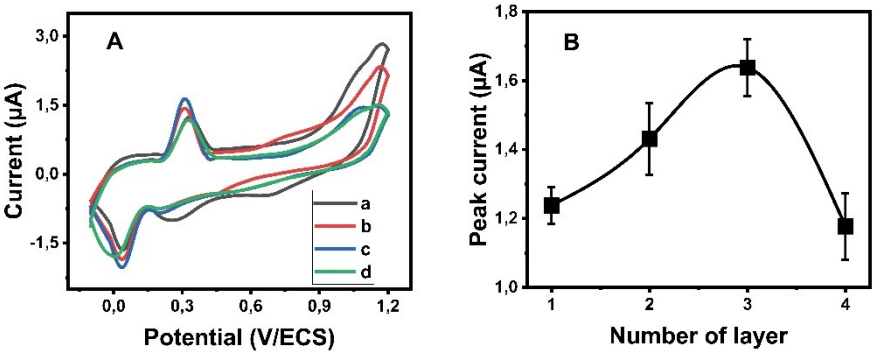

Fig. S3 A) Cyclic voltammograms of the AgCDs/Au electrode obtained from deposition of a) one layer, b) two layers c) three layers and d) four layers of AgCDs on the Au electrode in a 10^{-4} M Na_2SO_4 solution at 50 mV/s containing 2.5 ng/mL of each MG and LMG in the mixture. B) Peak current intensity of the MG and LMG mixture oxidation as a function of the number of layers.

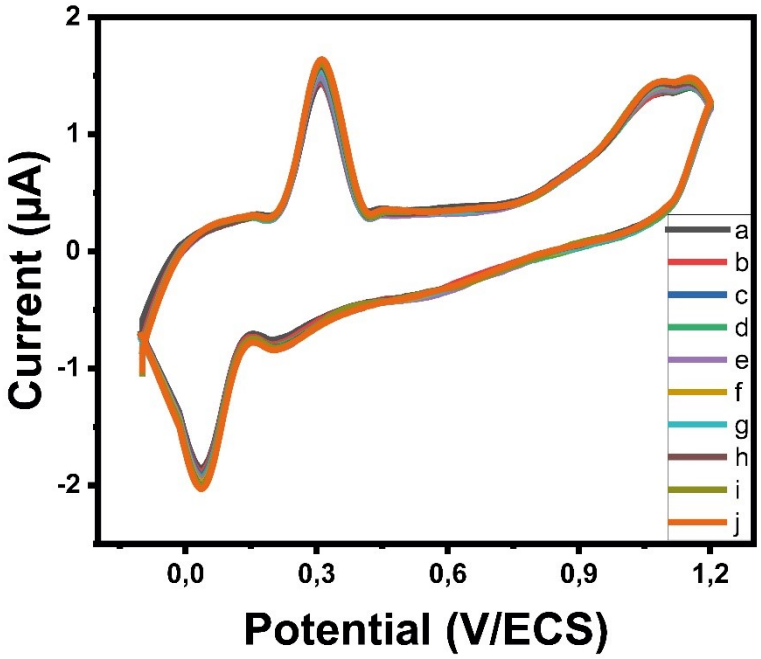

Fig. S4 Stability study of the AgCDs/Au electrode.

Table S1 Recovery using the fabricated sensor (n=3)

Added (ng/mL)	Found (pg/mL)[a]	recovery (%)
6	5.88	98±1.5
10	9.92	99.2±2
15	14.93	99.5±3.6
25	24.96	99.4±5.7
35	34.96	99.8±2.1
45	44.92	99.8±6.0
55	54.95	99.9±8.1

[a] Average value of recovered MG concentration.

Table S2 Recovery rate of 10 pg/mL MG in the presence of 100 pg/mL of the selected interfering compounds (n=3).

Compounds	C(pg/mL)[a]	C(pg/mL)b	Recovery (%)
MG	10	10	100
CAP	10	9.98	99.8

p-DAP	10	9.98	99.8
Bovine serum albumin	10	9.95	99.5
Cod liver oil	10	9.92	99.2
$CuSO_4$	10	9.94	99.4
$FeSO_4$	10	9.97	99.7
$Zn(NO_3)_2$	10	9.95	99.5
NaCl	10	9.87	98.7

C^a: Concentration added. C^b: Concentration found

Table S3: Intra-day and Inter-day studies (n=3).

Concentration added (pg/mL)	Concentration found (pg/mL)		RSD (%) (n=3)	
	Intra-day	Inter-day	Intra-day	Inter-day
8	7.93	7.88	4.9	9.29
15	14.86	14.91	8.5	4.36
25	24.82	24.91	6.66	9.61
35	34.92	34.89	3.06	0.57
45	44.83	44.82	9.17	3.51
55	54.9	54.89	7.00	2.52

RSD: Relative Standard Deviation.

Table S4: Stability of the AgCDs/Au electrode, 15 pg/mL MG and LMG each day.

Day	added (pg/mL)[a]	Found (pg/mL)[b]	Recovery (%)	RSD (%) (n=3)
1	15	14.92	99.47	3.05
2	15	14.87	99.13	2.52
3	15	14.89	99.27	1.00
4	15	14.88	99.20	2.65
5	15	14.86	99.06	2.52
6	15	14.84	98.93	2.08
7	15	14.85	99.00	1.53
8	15	14.82	98.8	1.50
9	15	14.79	98.60	3.10
10	15	14.81	98.73	4.58