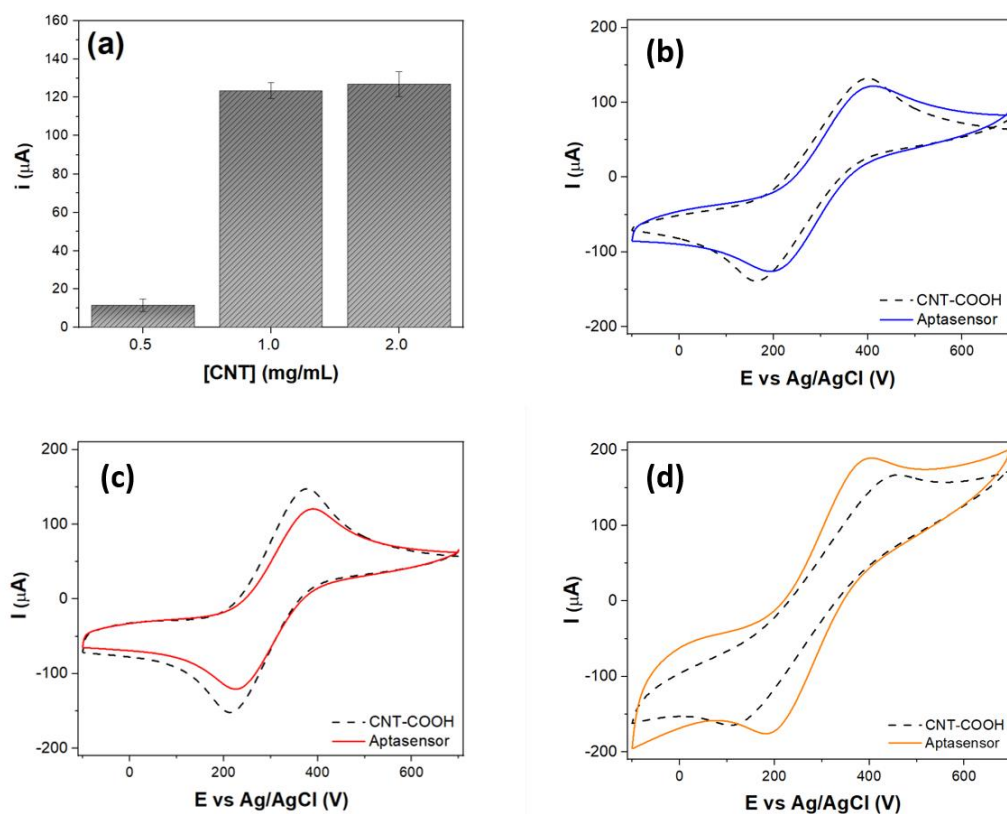


# Selective Label-Free electrochemical Aptasensor based on Carbon-Nanotubes for Carbendazim Detection

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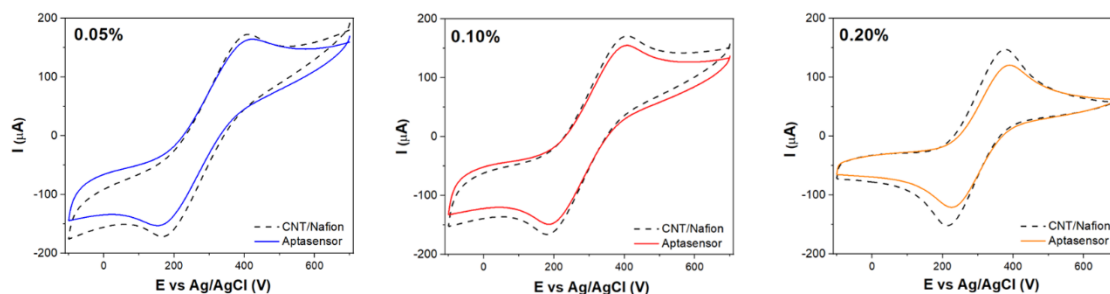
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**Figure S1.** (a) Optimization of the concentration of CNT in the dispersion with Nafion 0.2% obtained from fig.1a; (b-d) Cyclic voltammograms of 5 mM  $[\text{Fe}(\text{CN})_6]^{3-/4-}$  in PBS 0.1 M at pH 7.4 for electrodes modified with dispersions of CNT-COOH in Nafion 0.2%, and aptasensors constructed with different CNT concentrations: (b) 0.5 mg/mL; (c) 1 mg/mL, and (d) 2.0 mg/mL. Aptamer concentration = 10 μM.

**Table S1.** Current and differential potentials obtained from figure S1. All measurements were performed in triplicate.

CNT concentration (mg/mL)	$I_{pa}$ (μA)	$\Delta E_p$ (mV)	RSD (%)
0.5	$113.2 \pm 2.7$	$202.3 \pm 12.0$	2.9
1.0	$131.0 \pm 4.9$	$173.6 \pm 10.6$	3.2
2.0	$148.9 \pm 0.7$	$210.5 \pm 17.7$	5.0



**Figure S2.** Cyclic voltammograms of 5 mM  $[\text{Fe}(\text{CN})_6]^{3-/4-}$  in PBS 0.1 M at pH 7.4 for electrodes modified with dispersions of CNT-COOH in different Nafion concentrations and aptasensors constructed with different Nafion concentrations. Aptamer concentration = 10  $\mu\text{M}$ .

**Table S2.** Current and differential of potentials obtained for figure S2. All measurements were performed in triplicate.

Nafion concentration (% v/v)	$I_{pa}$ ( $\mu\text{A}$ )	$\Delta E_p$ (mV)	RSD (%)
0.05	$107.0 \pm 9.0$	$228.6 \pm 13.5$	8.4
0.1	$126.6 \pm 5.0$	$222.6 \pm 5.8$	3.9
0.2	$131.2 \pm 4.9$	$173.6 \pm 10.6$	3.7

**Table S3.** Current and differential potentials obtained with the activation of -COOH by EDC/NHS reaction. All measurements were performed in triplicate.

Time EDC/NHS reaction (h)	$I_{pa}$ ( $\mu\text{A}$ )	$\Delta E_p$ (mV)	RSD (%)
1	$131.1 \pm 4.9$	$173.6 \pm 10.6$	3.2
2	$134.0 \pm 17.3$	$231.6 \pm 7.6$	9.8

**Table S4.** Current and differential potentials obtained with the different concentrations of the aptamer. All measurements were performed in triplicate.

AP Concentration	$I_{pa}$ ( $\mu\text{A}$ )	$\Delta E_p$ (mV)	RSD (%)
1 $\mu\text{M}$	$102.9 \pm 3.4$	$236.3 \pm 2.3$	2.8%
5 $\mu\text{M}$	$99.7 \pm 10.5$	$245.0 \pm 16.8$	10.9%
10 $\mu\text{M}$	$94.4 \pm 0.2$	$248.3 \pm 2.5$	0.2%
20 $\mu\text{M}$	$97.6 \pm 16.8$	$237.6 \pm 25.7$	16%

**Table S5.** Current and differential potentials obtained with the different incubation times of the aptamer. All measurements were performed in triplicate.

Incubation time (h)	$I_{pa}$ ( $\mu\text{A}$ )	$\Delta E_p$ (mV)	RSD (%)
1	$123.8 \pm 1.8$	$187.6 \pm 7.6$	1.2
5	$120.6 \pm 3.8$	$208 \pm 7.5$	2.4

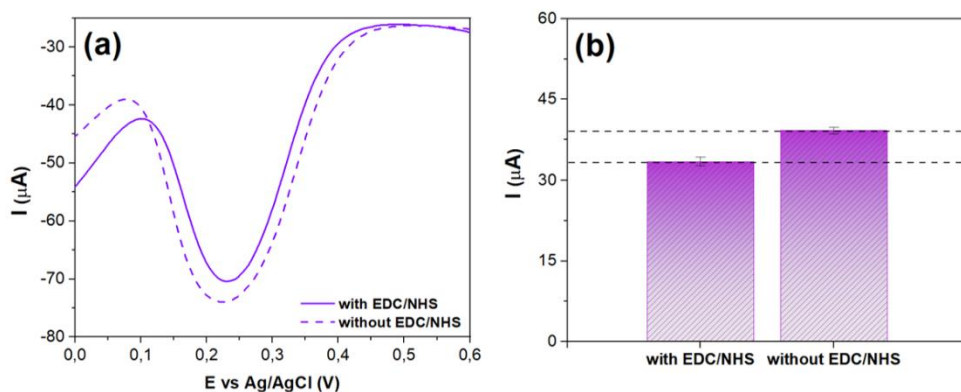
12	94.6±2.8	218.6±4.9	2.3
24	102.6±5.5	232.2±5.5	4.0

**Table S6.** Effect of the electrode used for the construction of the aptasensor under optimized conditions

Electrode	$I_{pa}$ ( $\mu A$ )	$\Delta E_p$ (mV)	RSD
SPAuNPE	94.6±2.8	218.6±4.9	2.3%
SPCE	90.2±4.7	252.6±9.6	3.6%

**Table S7.** Current and differential potentials obtained with the different binding times of CBZ. All measurements were performed in triplicate.

Binding time (min)	$I_{pa}$ ( $\mu A$ )	$\Delta E_p$ (mV)	CV
5	113.0±18.2	252.0±5.6	16.1%
30	27.5±2.5	218.6±2.3	9.0%
60	26.7±2.4	217.3±2.3	8.9%
120	38.5±4.7	218.6±2.3	12.2%



**Figure S3.** Effect of the presence and absence of EDC/NHS in the activation of -COOH to achieve the aptamer's covalent immobilization. (a) Differential pulse voltammograms of aptasensors with 10 nM CBZ in 5.0 mM  $[Fe(CN)_6]^{4-/3-}$  in 0.1 M PBS + 0.1 M KCl (pH 7.4), and (b) bar graph from (a). All measurements were performed in triplicate.