Electronic Supporting Material

DEVELOPMENT OF OPTICAL AND ELECTROCHEMICAL IMMUNODEVICE FOR THE DENGUE VIRUS DETECTION

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Figure S1. The FTIR transmittance spectrum illustrates the modification achieved through the chemisorption of CdTe quantum dots and cysteine.

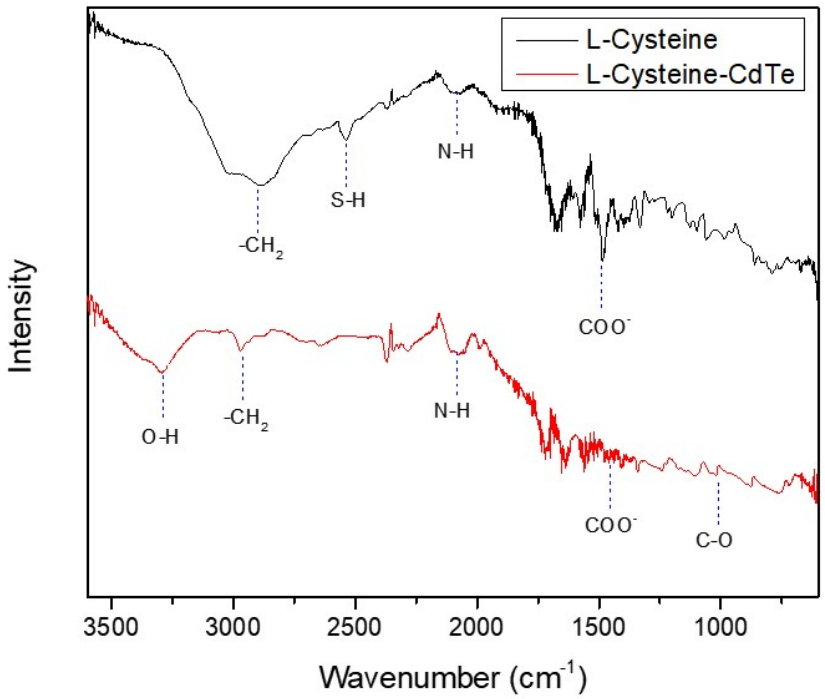

Figure S2. Graph illustrating the binding curves of each component in the biosensor platform: Cys (1); EDC:NHS (2); CdTe quantum dots (3); DENV-1 immunoglobulin (4); and DENV-1 in dilutions of 1:50 (5), 1:40 (6), 1:30 (7), 1:20 (8), and 1:10 (9).

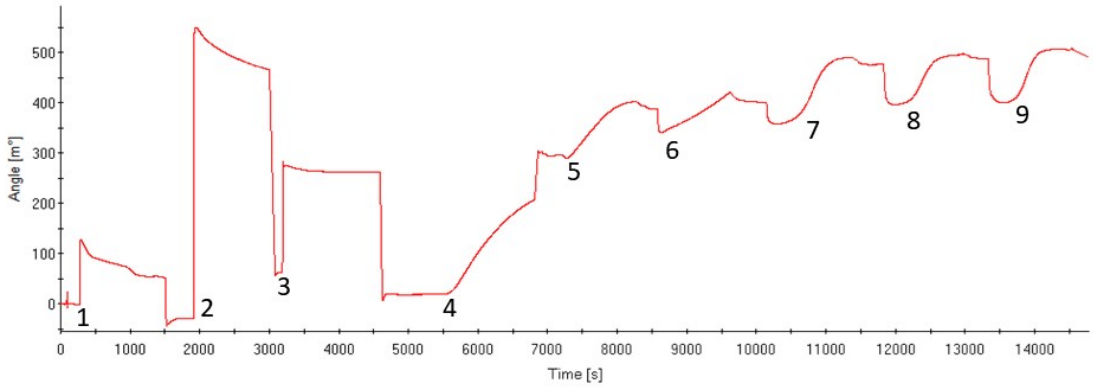

Table S1. Quantification of DENV isolates by plaque formation assay.

Sample	Analyte dilution	Viral Title (PFU/mL)
DENV-1 Isolate	-	$2.0x10^7$
DENV-1	1:50	$0.4x10^6$
DENV-1	1:40	$0.5x10^6$
DENV-1	1:30	$0.66x10^6$
DENV-1	1:20	$1.0x10^6$
DENV-1	1:10	$2.0x10^6$
DENV-2 Isolate	-	$2.7x10^6$
DENV-2	1:50	$0.05x10^6$
DENV-2	1:40	$0.06x10^6$
DENV-2	1:30	$0.09x10^6$
DENV-2	1:20	$0.135x10^6$
DENV-2	1:10	$0.27x10^6$

Table S2. Variation in diffraction angles over time for each sample deposited on the gold electrode surface.

Sample	Angle (m^{o})	Time (s)
-	0.00	115
Cysteine	50.10	1500
EDC/NHS	455.20	3076
CdTe quantum dots	262.50	4626
Anti-DENV-1 antibody	204.40	6780
DENV-1 (1:50)	401.30	8194
DENV-1 (1:40)	418.00	9595
DENV-1 (1:30)	489.20	11275
DENV-1 (1:20)	496.90	12959
DENV-1 (1:10)	505.90	14429

Table S3. Amperometric anodic shift for the construction steps of the biosensor after its exposure to DENV-1 and DENV-2.

Electrode modification	Concentration (PFU/mL)	I_{PA} before recognition (µA)	I_{PA} after recognition (µA)	ΔI (%)
Gold electrode	-	86.32 ± 3.91	-	-
Cys	-	77.26 ± 3.00	-	-
Cys-CdTe	-	60.49 ± 2.60	-	-
Cys-CdTe-Antibody$_{DENV-1}$-BSA	-	45.35 ± 1.25	-	-
Biossensor-DENV-1	0.4x10^6	-	33.72 ± 1.46	34.66 ± 5.84
Biossensor-DENV-1	0.5x10^6	-	25.01 ± 0.87	81.47 ± 6.32
Biossensor-DENV-1	0.66x10^6	-	19.86 ± 0.94	97.15 ± 14.75
Biossensor-DENV-1	1.0x10^6	-	15.55 ± 0.72	192.06 ± 13.54
Biossensor-DENV-1	2.0x10^6	-	12.48 ± 0.43	263.67 ± 12.54
Cys-CdTe-Antibody$_{DENV-2}$-BSA		53.88 ± 1.87		
Biossensor-DENV-2	0.05x10^6	-	41.38 ± 1.37	30.30 ± 2.32
Biossensor-DENV-2	0.06x10^6	-	38.03 ± 1.09	41.76 ± 2.06
Biossensor-DENV-2	0.09x10^6	-	36.22 ± 1.51	48.93 ± 2.21
Biossensor-DENV-2	0.135x10^6	-	34.54 ± 1.46	56.18 ± 3.61
Biossensor-DENV-2	0.27x10^6	-	33.02 ± 1.35	63.36 ± 3.68

Table S4. Analysis of the sensor against interfering molecules.

Interfering molecules	R_{CT} (Ω)	CPE (µF)	R_S (Ω)	Z_W
Healthy serum 1	267 ± 12	4.11 ± 0.56	438 ± 16	481 ± 0.12
Healthy serum 2	235 ± 07	10.6 ± 0.49	578 ± 22	254 ± 0.07
Healthy serum 3	263 ± 09	59.0 ± 0.62	361 ± 12	613 ± 0.19
Glucose	240 ± 14	3.90 ± 0.17	433 ± 14	489 ± 0.08
Citric acid	250 ± 05	33.0 ± 0.29	386 ± 09	662 ± 0.11
Cholesterol	255 ± 11	16.9 ± 0.41	527 ± 08	272 ± 0.13
NSE	231 ± 10	15.6 ± 0.46	332 ± 15	573 ± 0.14
Ascorbic acid	224 ± 13	11.5 ± 0.32	411 ± 11	510 ± 0.10