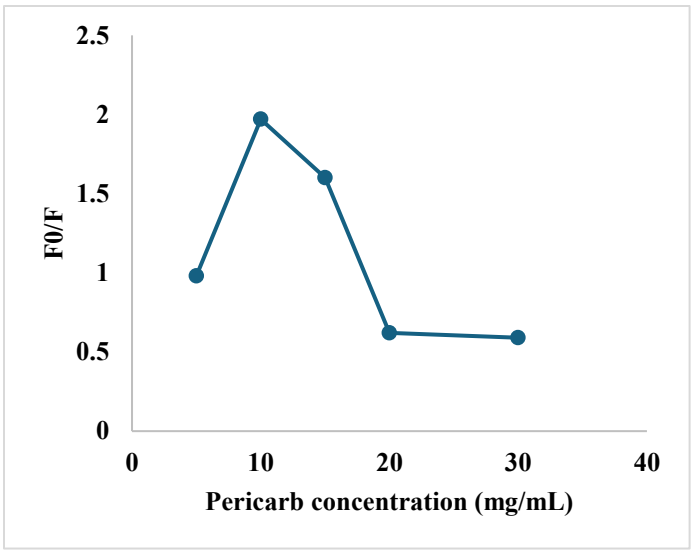
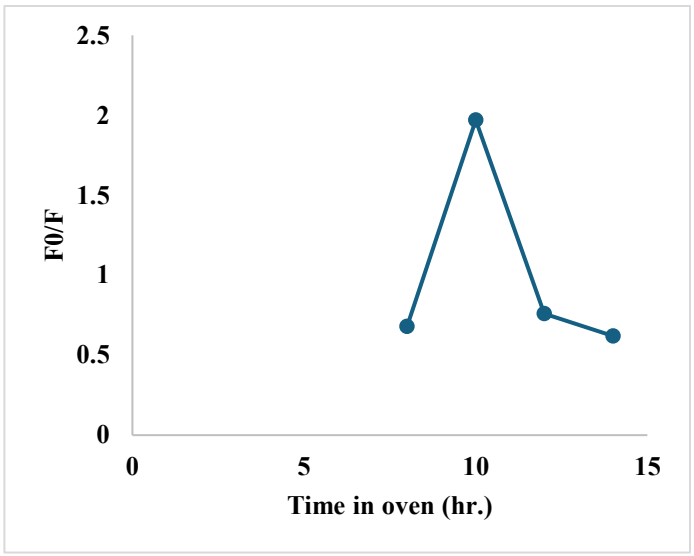




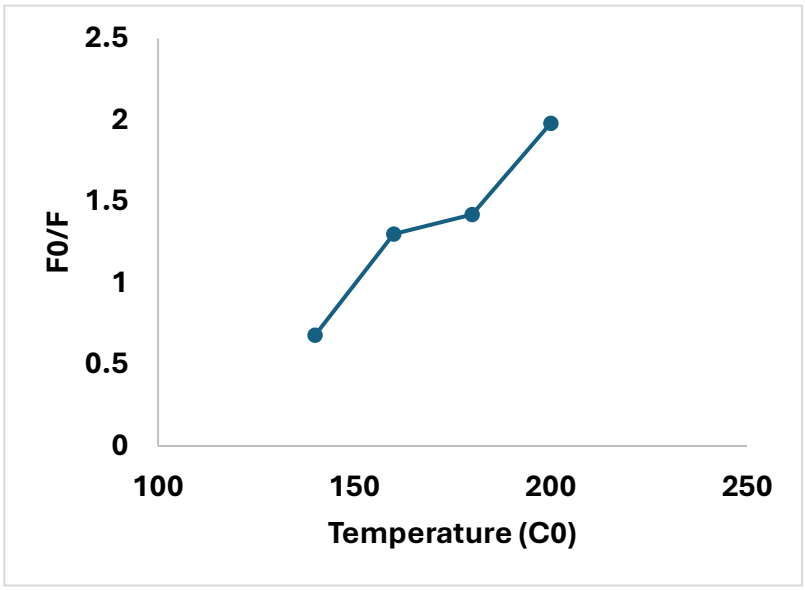


Figure S1. Optimization of different parameters affecting C-dots preparation

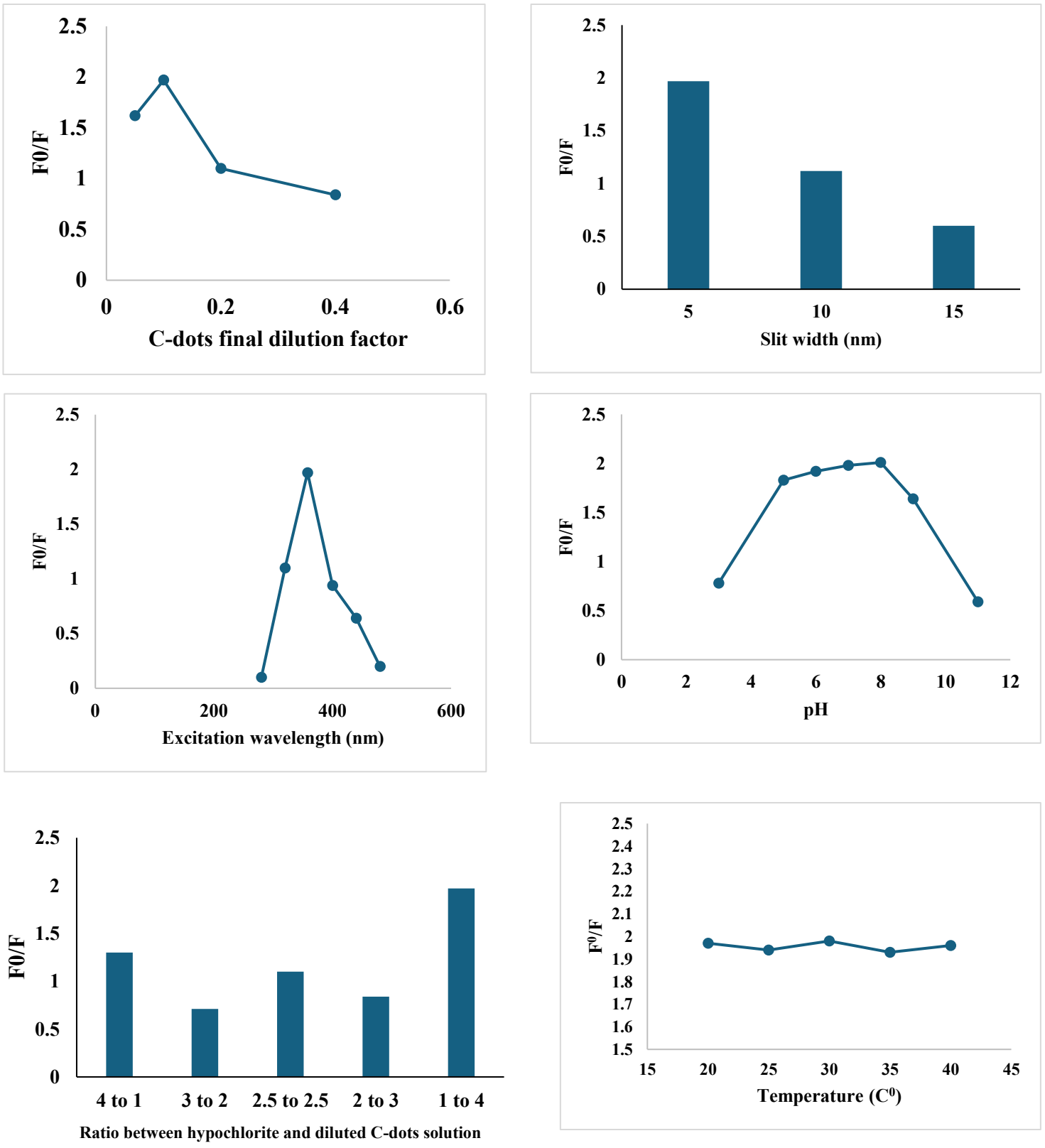
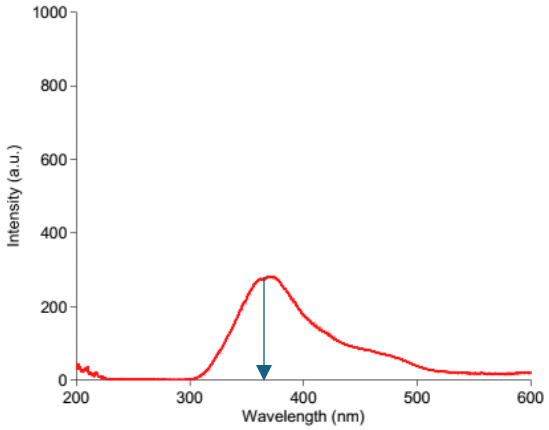
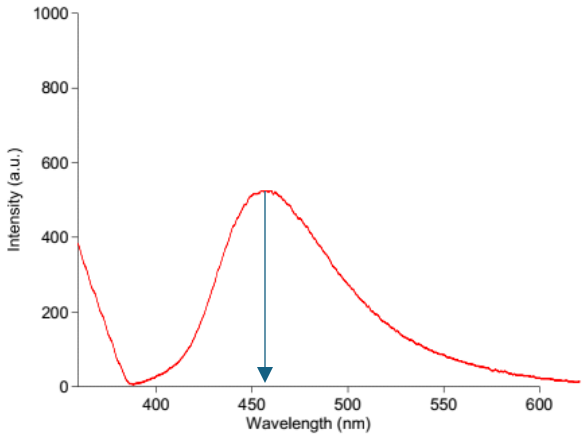


Figure S2. Optimization of different parameters affecting measurements of water containing hypochlorite through quenching of the fluorescence of the prepared C-dots

A

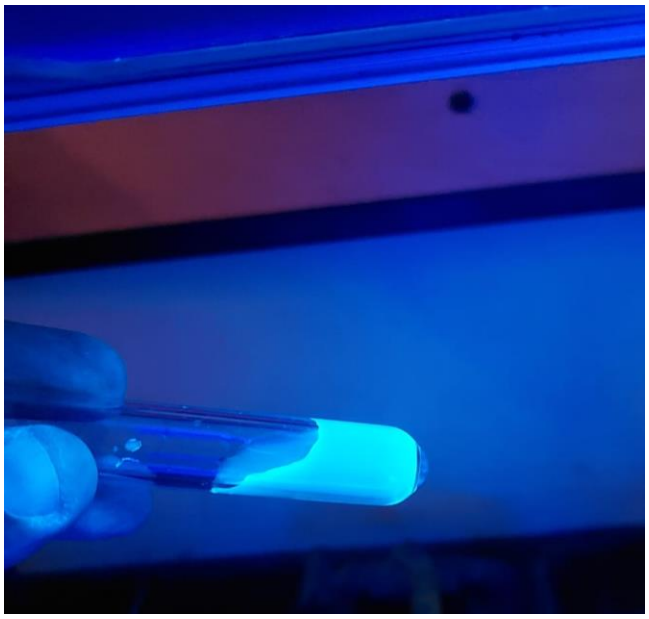


Excitation spectrum (λmax excitation = 358 nm)

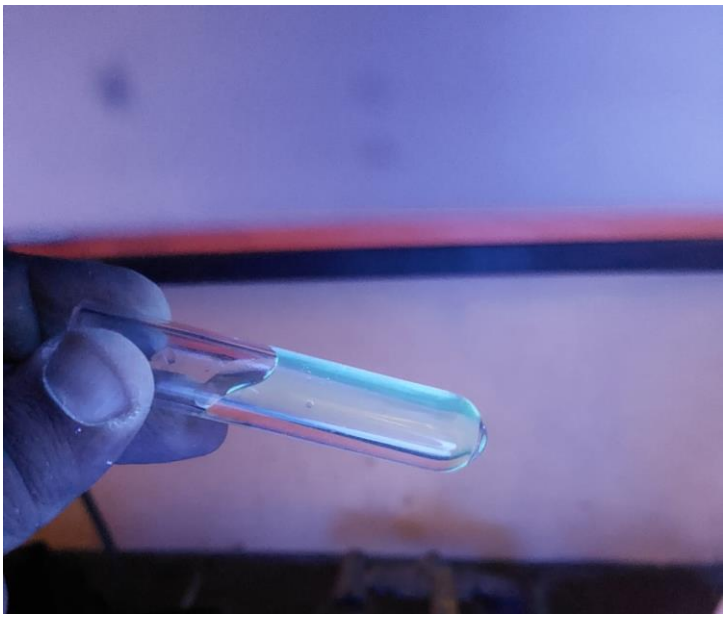


Emission spectrum (λmax emission = 460 nm)

B



C-dots solution under UV-lamp 365 nm



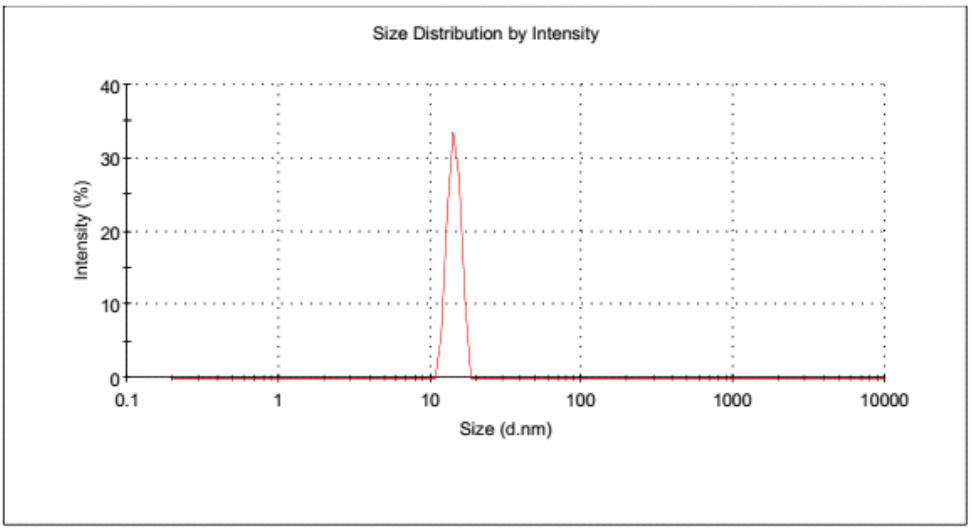
C-dots solution after addition of water containing hypochlorite under UV-lamp 365 nm

Figure S3. A) Excitation and emission spectra of C-dots solution

B) C-dots solution under UV-lamp 365 nm before and after addition of hypochlorite solution.

A

		Size (d.n...	% Intensity	Width (d.n...
Z-Average (d.nm): 12.1	Peak 1:	12.12	100.0	15.01
PdI: 0.171	Peak 2:	0.000	0.0	0.000
Intercept: 0.507	Peak 3:	0.000	0.0	0.000
Result quality Good				



B

		Mean (mV)	Area (%)	Width (mV)
Zeta Potential (mV): -37.22	Peak 1:	-37.22	100.0	3.68
Zeta Deviation (mV): 3.68	Peak 2:	0.00	0.0	0.00
Conductivity (mS/cm): 0.173	Peak 3:	0.00	0.0	0.00
Result quality Good				

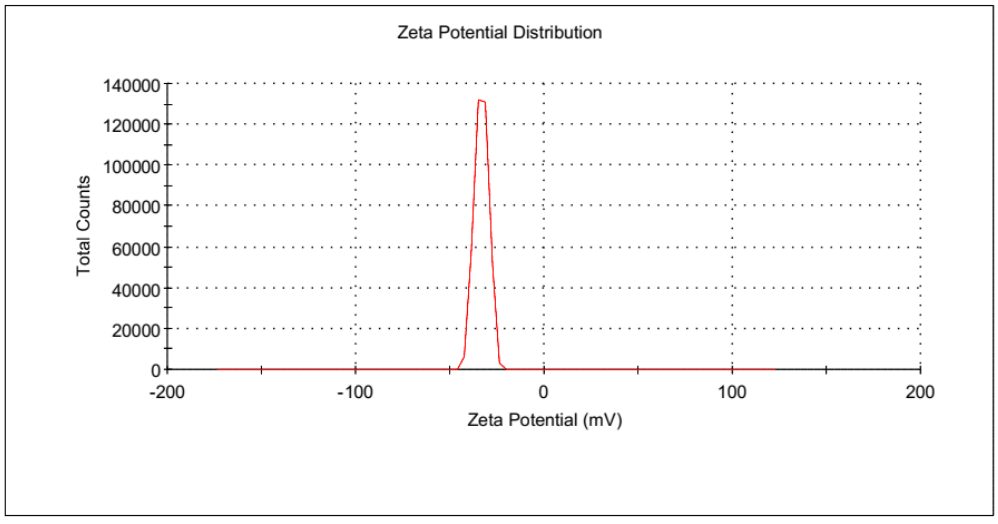


Figure S4. A) Dynamic light scattering of particle size of the prepared C-dots using distilled water as a solvent B) Zeta potential measurement for the prepared C-dots.

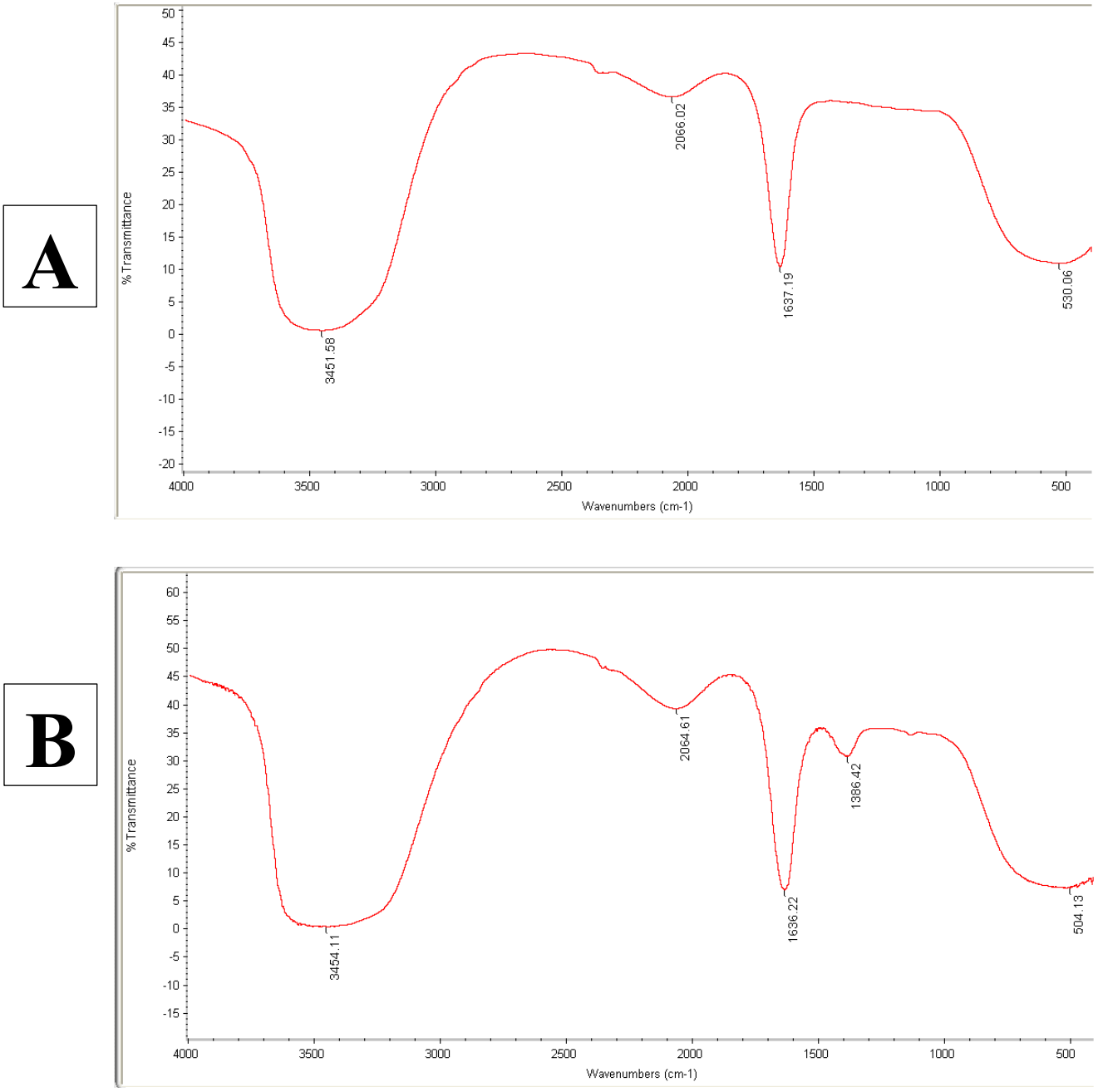


Figure S5. A) FT-IR analysis of the prepared C-dots.

B) FT-IR analysis of the prepared C-dots after mixing with hypochlorite.

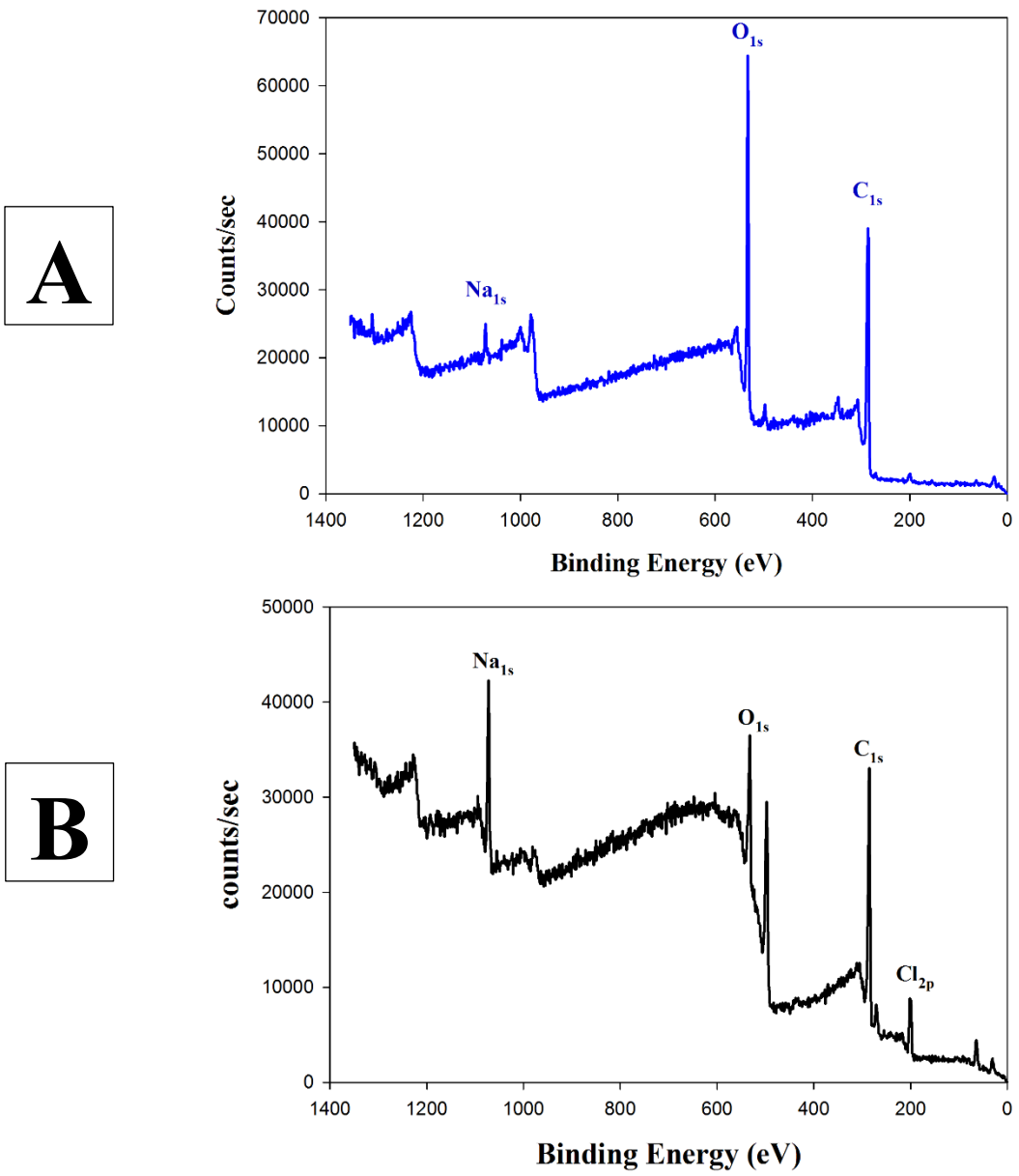


Figure S6. X-ray photoelectron spectroscopic analysis for A) the prepared C-dots

B) The prepared C-dots after mixing with hypochlorite.

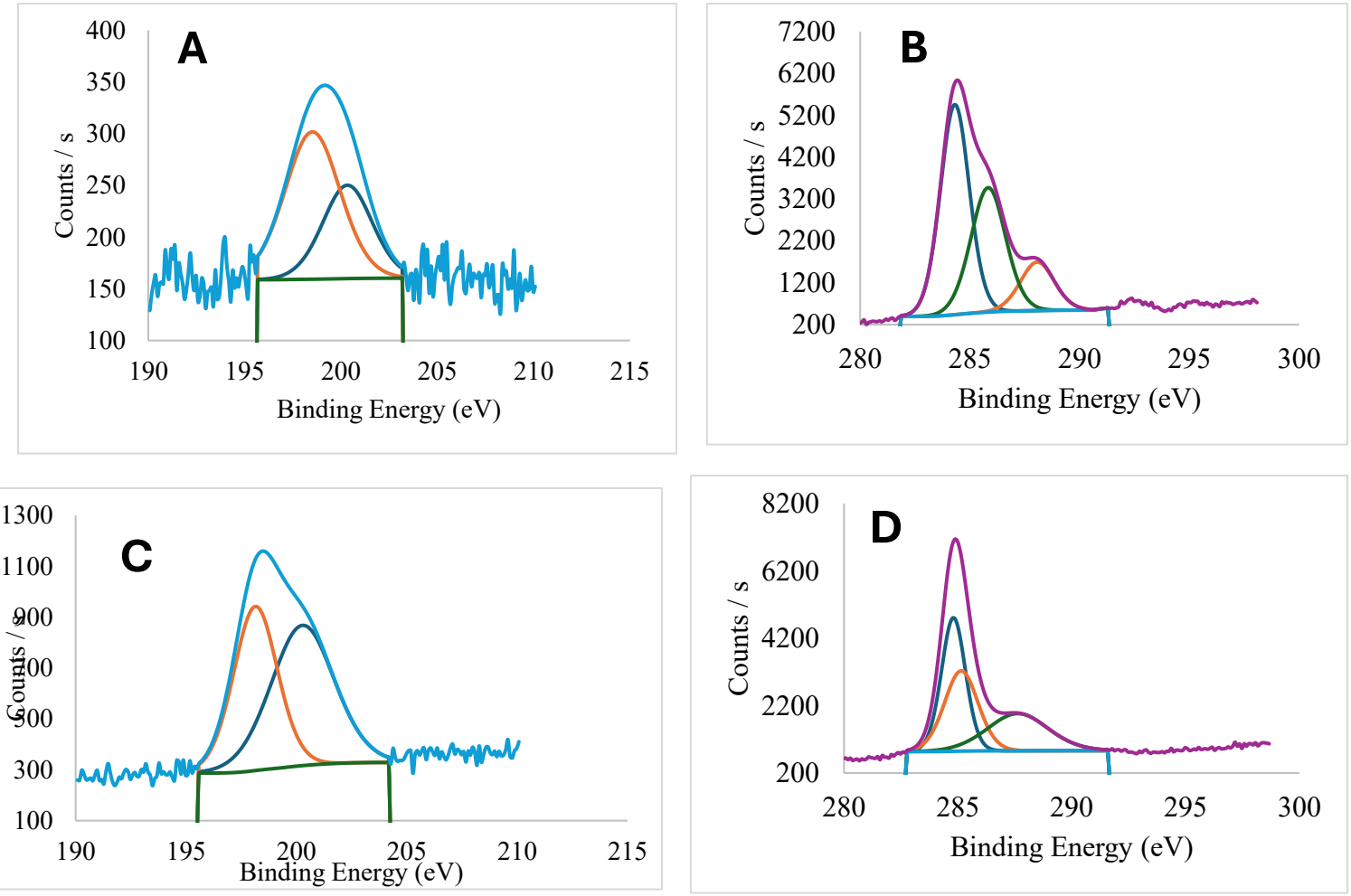


Figure S7. High-resolution XPS spectra of the prepared C-dots (Cl 2p and C 1s) before and after hypochlorite exposure. **(A)** Cl 2p (before): peaks at **197.95 eV** (inorganic Cl^-) and **199.88 eV** (surface-bound/partially oxidized Cl). **(B)** C 1s (before): **284.81 eV** (C–C/C=C), **285.15 eV** (C–O/C–N), **287.63 eV** (C=O/COOH). **(C)** Cl 2p (after): **199.35 eV** and **200.33 eV** (increased oxidized/adsorbed chlorine species). **(D)** C 1s (after): **284.31 eV** (C–C/C=C), **285.83 eV** (C–O/C–N), **288.07 eV** (increased C=O/COOH).

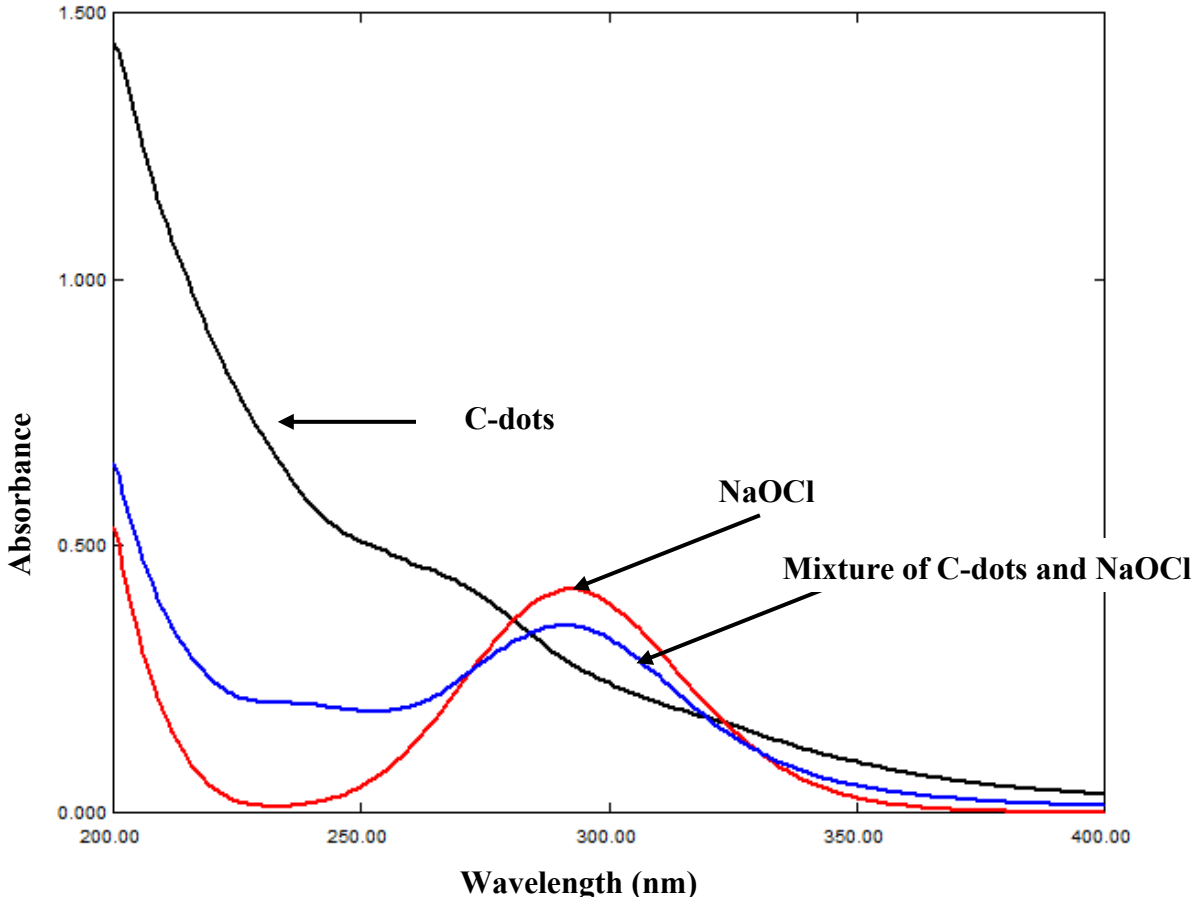


Figure S8. UV-visible spectrophotometric analysis showing C-dots (black line), Hypochlorite (red line) and the mixture between hypochlorite and C-dots (blue line).

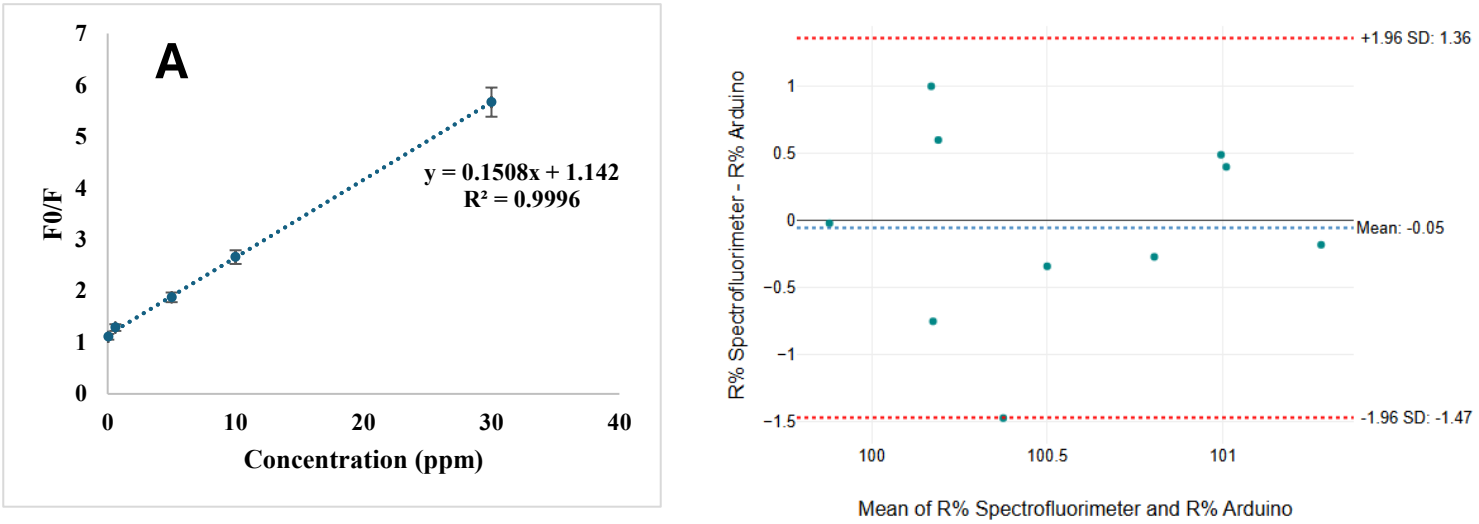
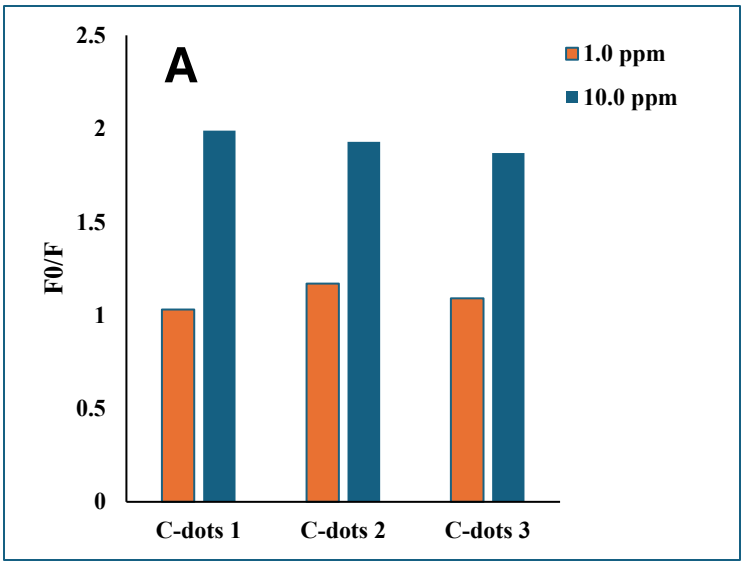
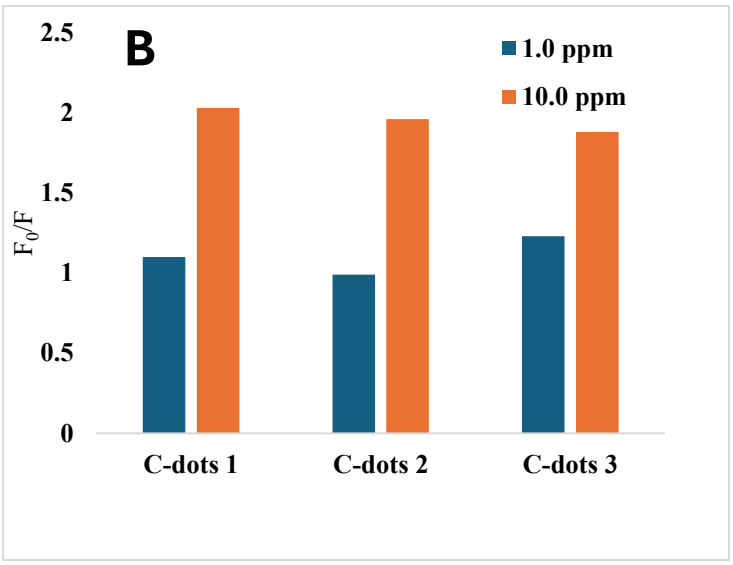


Figure S9. (A) Calibration curve of FQ response against concentration of hypochlorite using Arduino based portable device. **(B)** Bland–Altman plot showing the comparison between the Arduinos based device readings and the conventional spectrofluorometer.

Figure S10. Bland–Altman plot showing the agreement between C-dots and EPA colorimetric methods





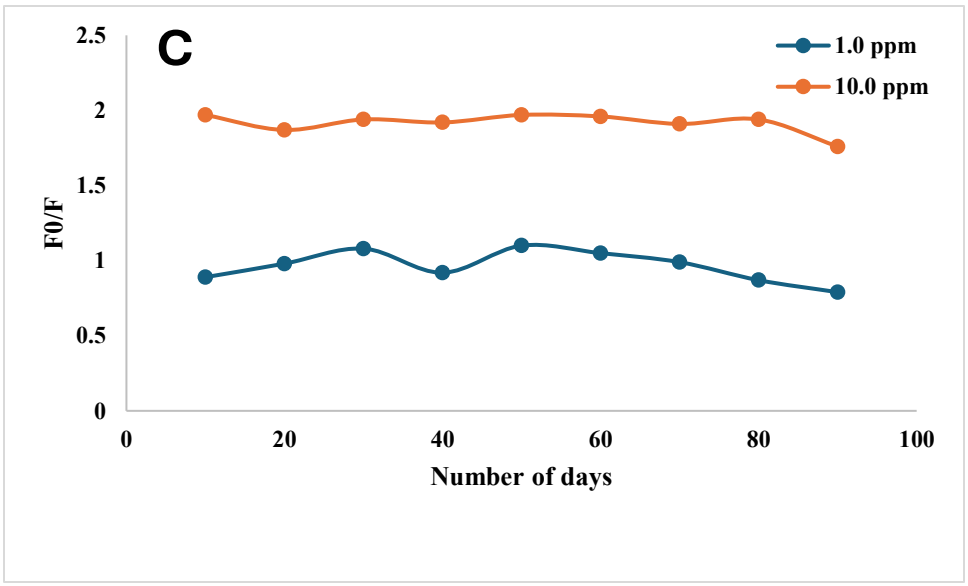


Figure S11. Diagrammatic illustration for (a): intra-batch, (b): inter-batch reproducibility of C-dots preparation and (c) Sensor stability over 3 months

Table S1. Statistical comparison between the standard EPA colorimetric method (4500 Cl-G) and the proposed method for NaOCl determination in pool water sample.

Parameter	Proposed method	EPA colorimetric method
Recovery after standard addition techniques (0.30 ppm added NaOCl)	100.18	100.04
S.D.	1.47	1.29
n	5	5
Variance	2.16	1.66
Students t-test (2.365)	1.29	----
F value (6.39)	1.60	----

Table S2. Statistical comparison between the reported and the proposed method for NaOCl determination in pool water sample.

Parameter	Proposed method	Reported method [20]
Recovery after standard addition techniques (0.30 ppm added NaOCl)	100.18	100.30
S.D.	1.47	1.68
n	5	5
Variance	2.1609	2.822
Students t-test (2.365)	0.098	----
F value (6.39)	1.655	----

[20] X. Ma, Q. Hu, J. Yuan, Y. Feng, Z. Cheng, Glutathione Modified silicon-doped Carbon Quantum dots as a Sensitive Fluorescent Probe for ClO− Detection, Journal of Fluorescence 35 (2025) 3529-3538. 10.1007/s10895-024-03797-4.