

Supporting Information

High throughput electron transfer from carbon dots to chloroplast: A rationale of enhanced photosynthesis

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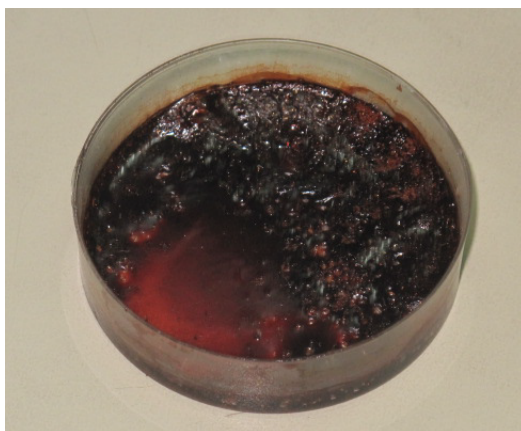


Figure S1 Digital photograph of the as synthesized carbon dots.

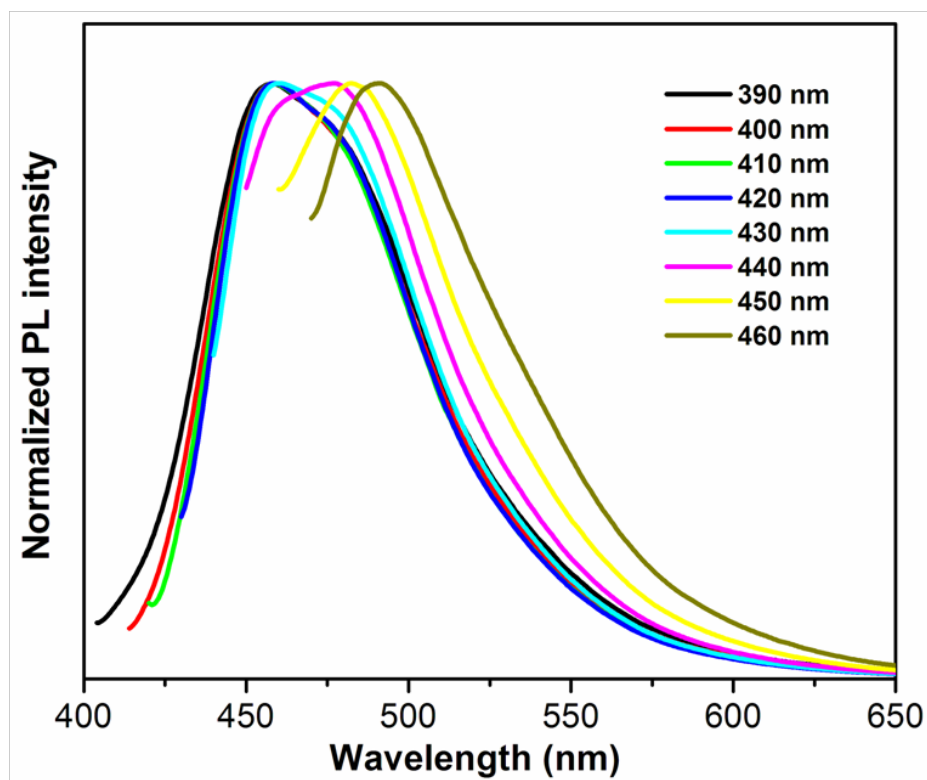


Figure S2 Normalized PL emission of the amine terminated carbon dots.

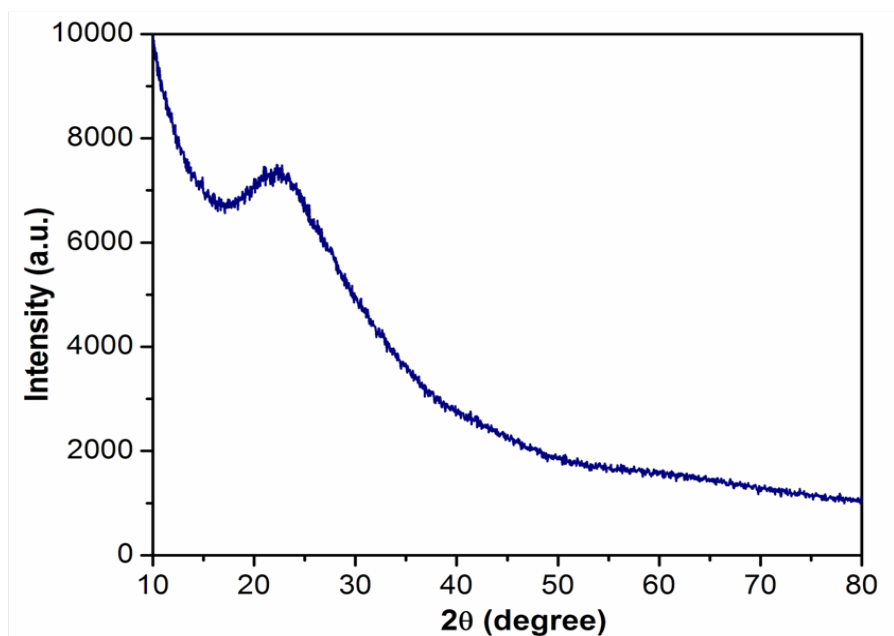


Figure S3 XRD pattern of the amine functionalized CQD.

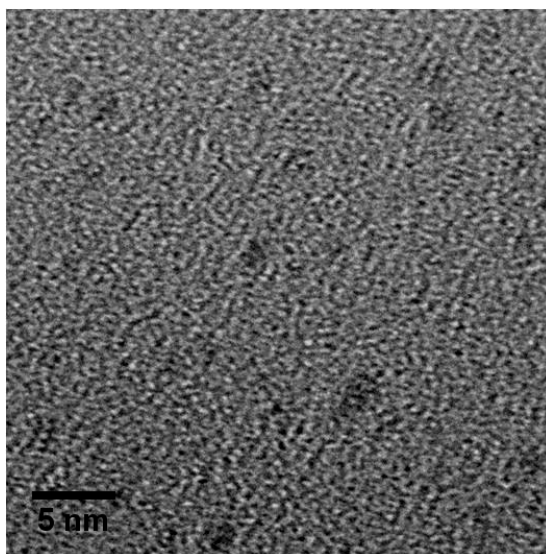


Figure S4 HR-TEM image of CQD.

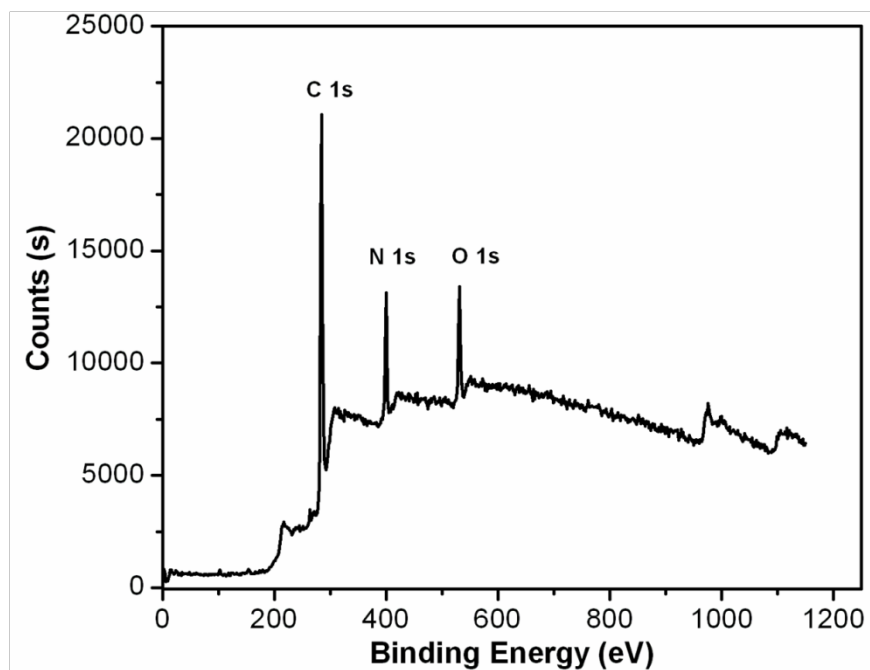


Figure S5 X-ray photoelectron spectrum (XPS) of carbon dots

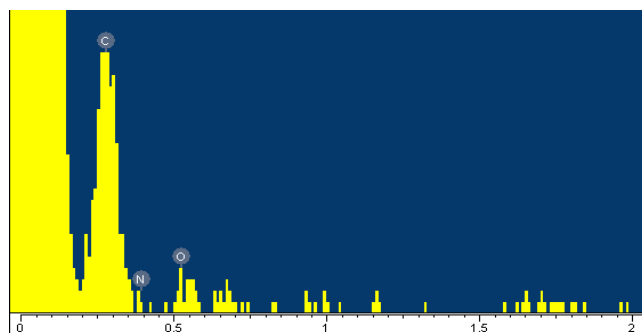


Figure S6 EDX analysis of the CQDs confirm the presence of carbon, oxygen and nitrogen as the major substituent.

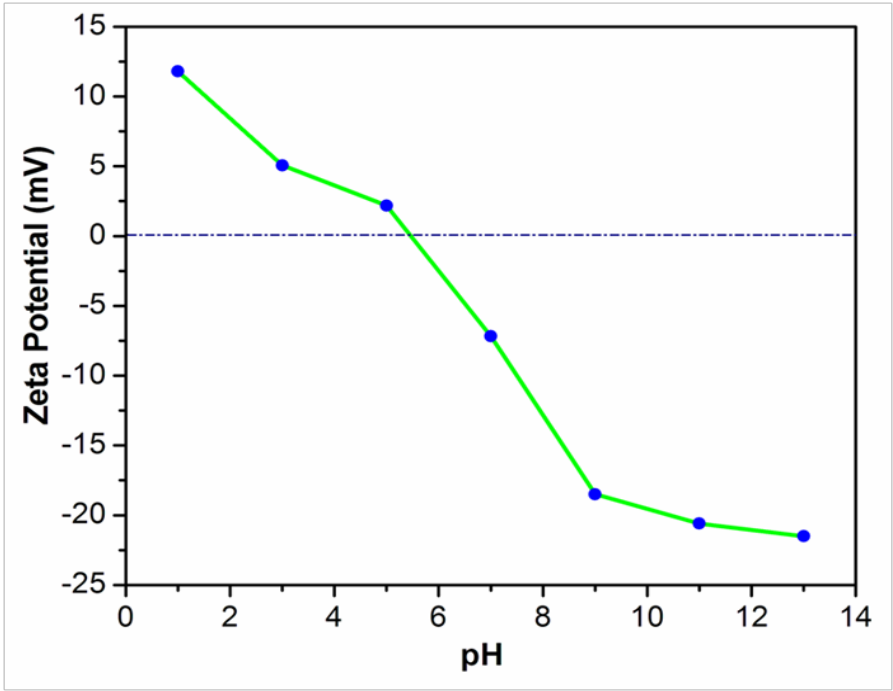


Figure S7 Zeta potentials (mV) of the carbon dots against the pH of the medium.

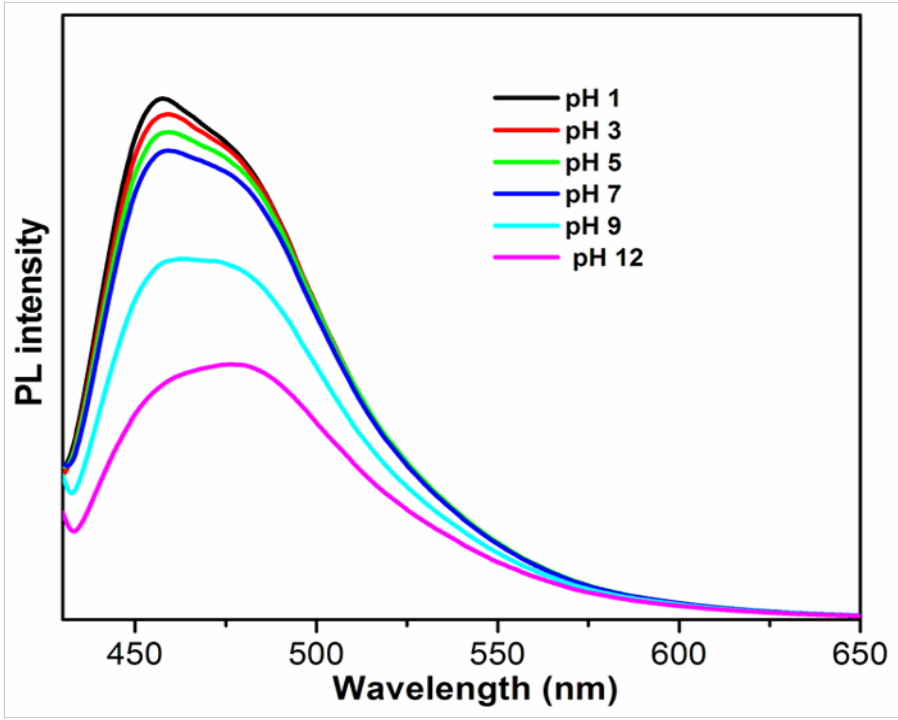


Figure S8 PL emission of the carbon dots at different pH medium.

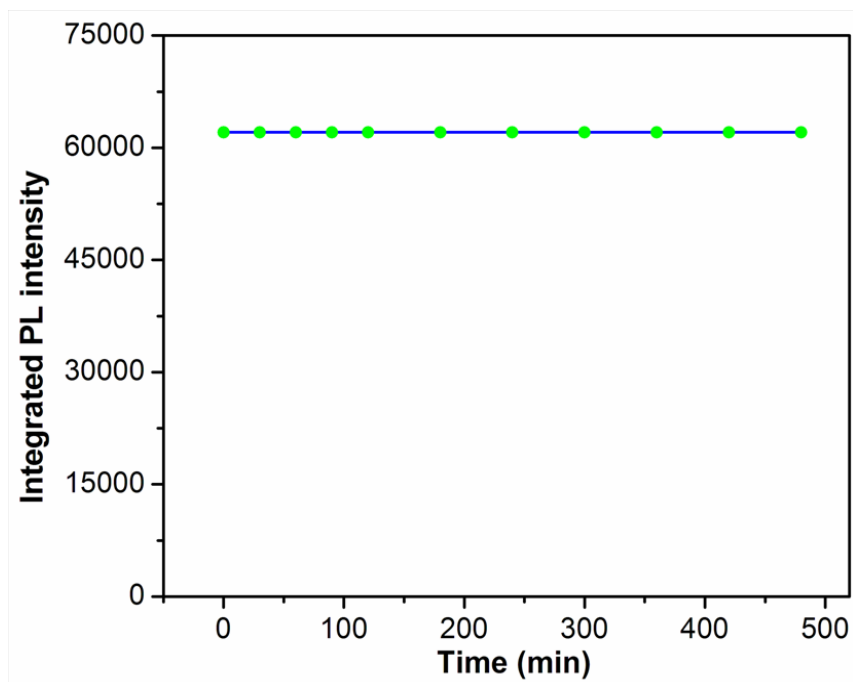


Figure S9 Plot of integrated PL intensity of the carbon dots against the time of UV irradiation, manifesting that they are highly photostable in nature.

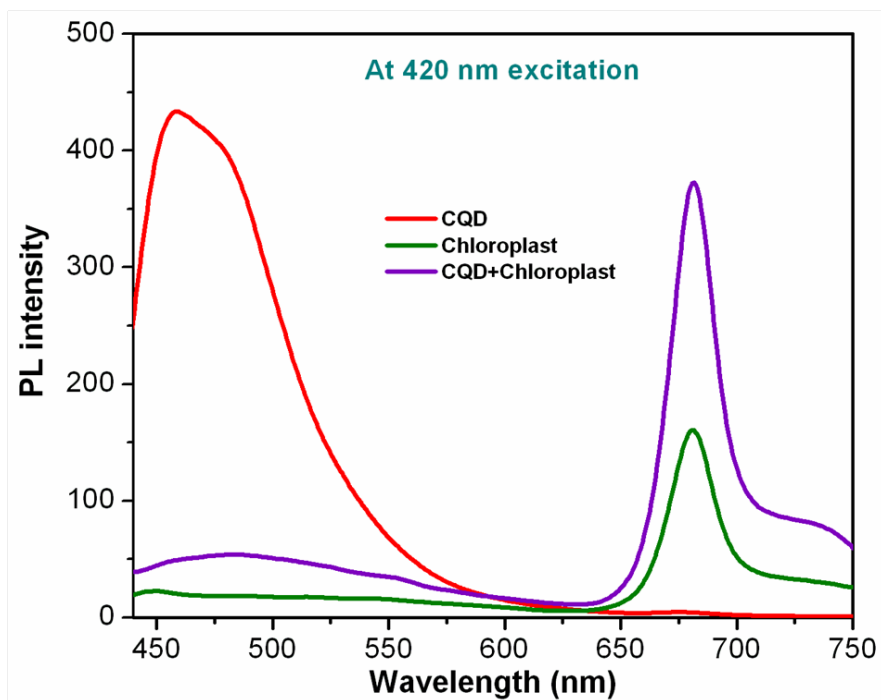


Figure S10 PL spectrum of CQD, chloroplast and CQD conjugated CLP at 420 nm excitation wavelength.

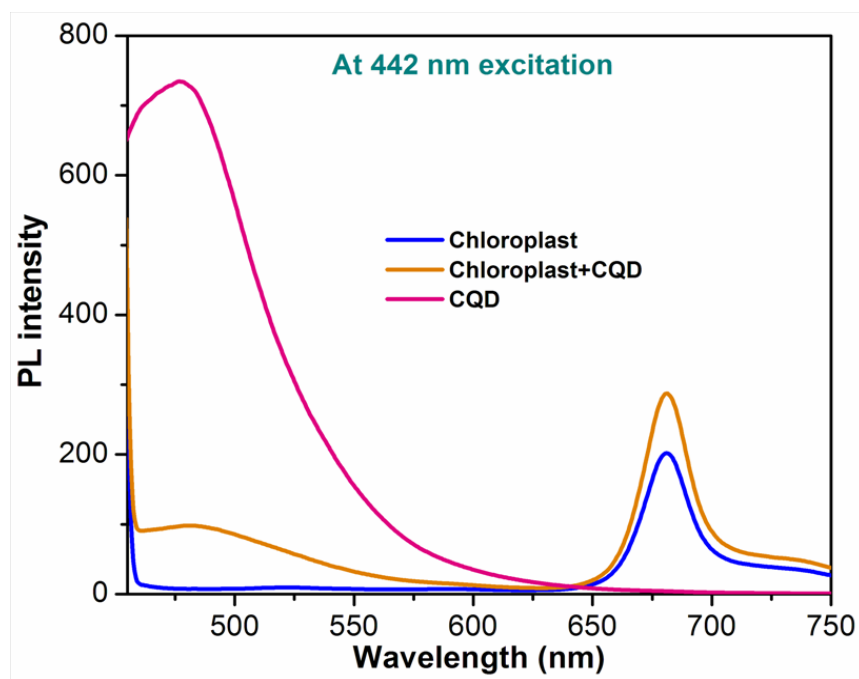


Figure S11 PL spectrum of CQD, chloroplast and CQD conjugated CLP at 442 nm excitation wavelength.

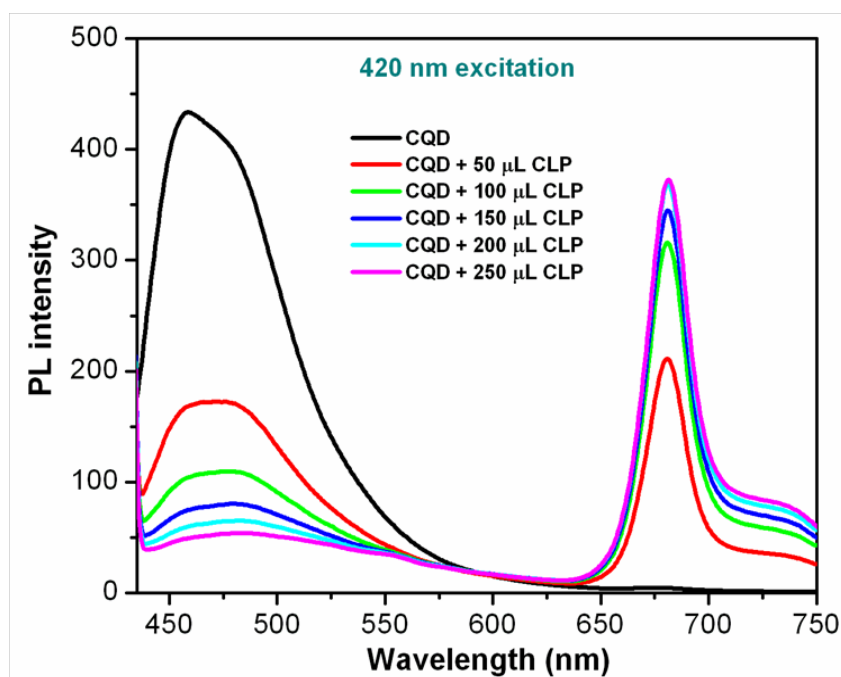


Figure S12 Emission spectra of CQD with dropwise addition of chloroplast at 420 nm excitation.

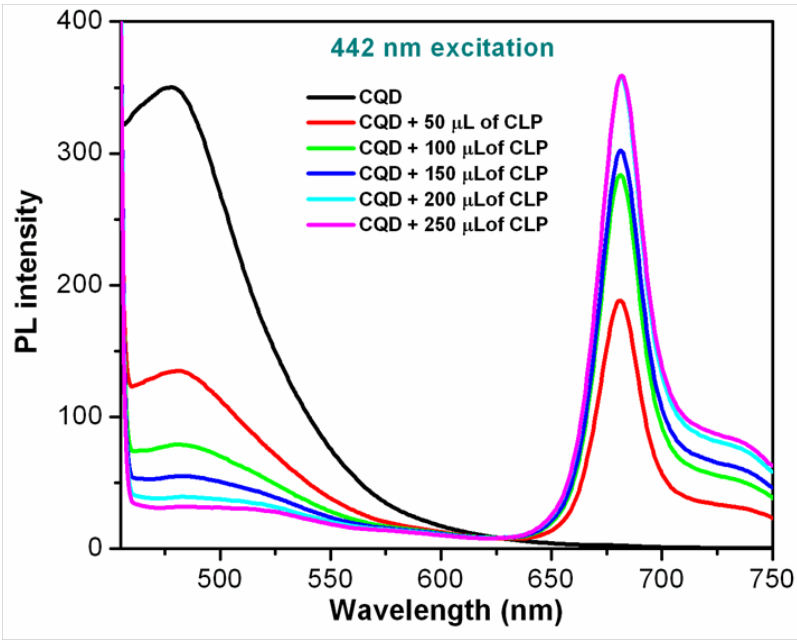


Figure S13 Emission spectra of CQD with dropwise addition of chloroplast at 442 nm excitation.

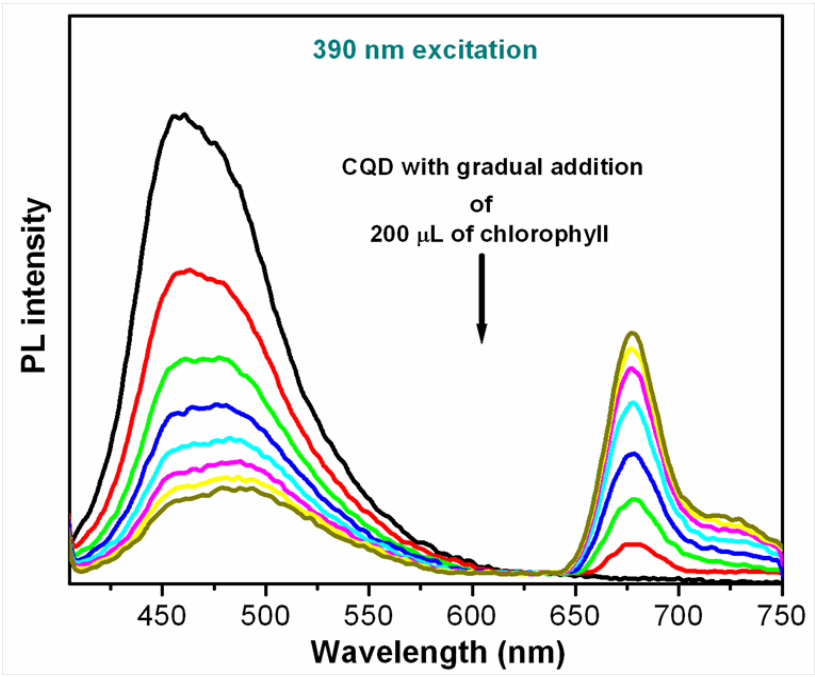


Figure S14 Emission spectra of CQD with dropwise addition of chlorophyll at 390 nm excitation.

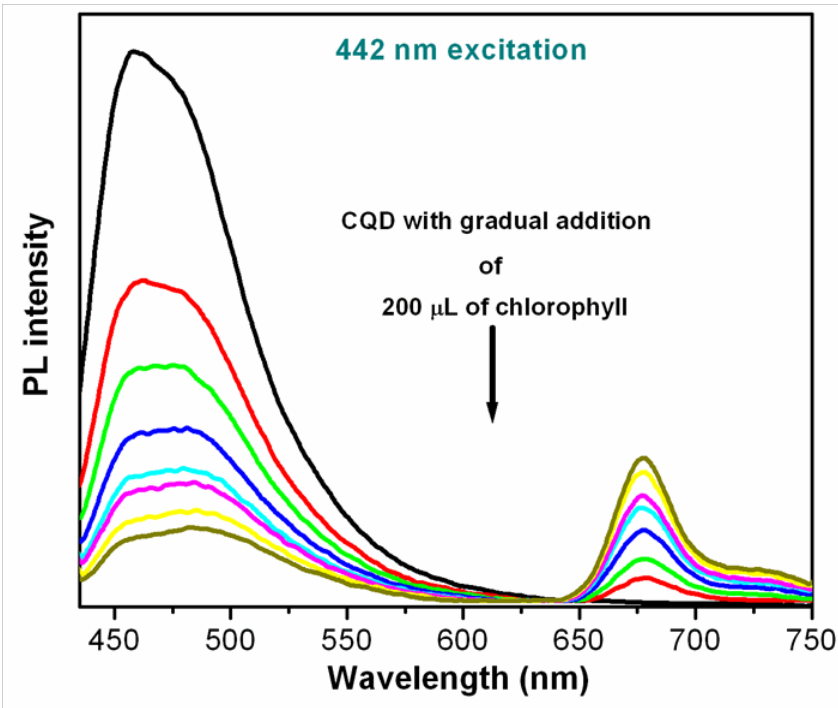


Figure S15 Emission spectra of CQD with dropwise addition of chlorophyll at 442 nm excitation.

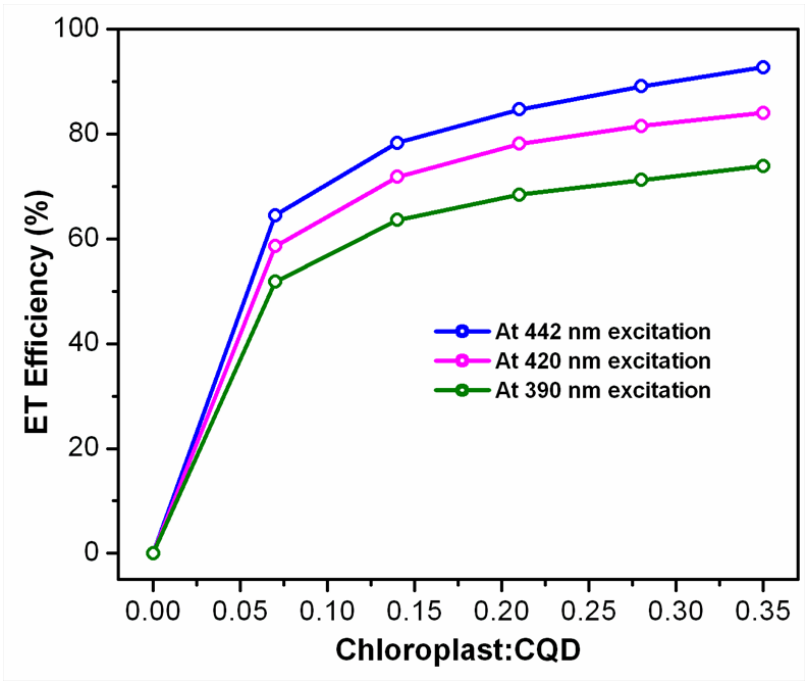


Figure S16 ET efficiency against the ratio of CLP/CQD, measured at different excitation wavelength.

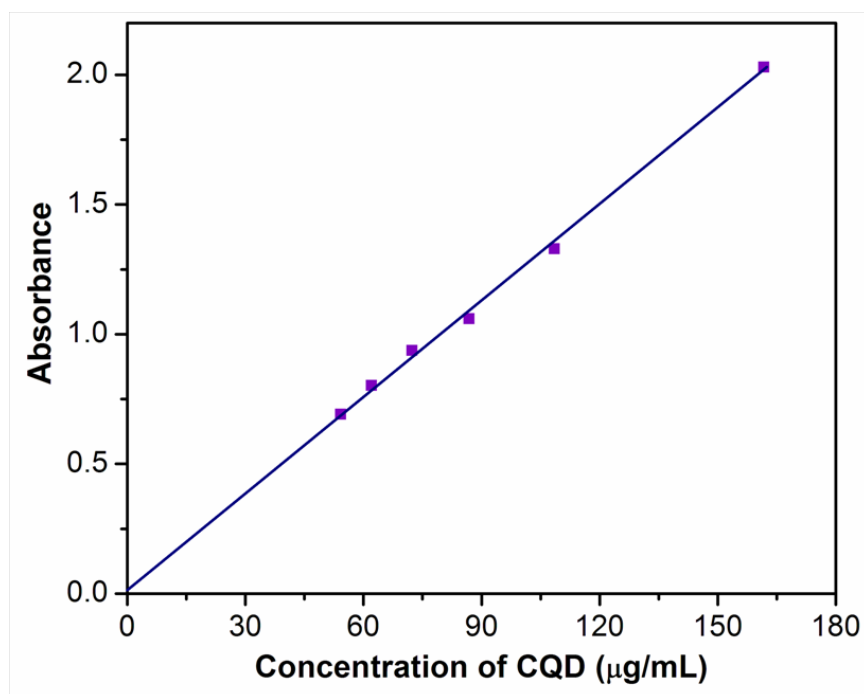


Figure S17 Standard curve of plotting the absorbance of CQD against its concentration.

From the standard curve shown in figure S14 demonstrated that after addition of 20 μL of water in 144.67 μg/mL concentration of 3 mL CQD, the final concentration will be 143.71 μg/mL. However when 20 μL of chloroplast was added to the above solution containing 3 mL of 144.67 μg/mL CQD, the absorbance became to 1.710 correspond to 136.8 μg/mL of CQD. Therefore the total amount of CQD adsorbed by CLP was equal to (143.71–136.8) μg/mL, i.e., 6.91 μg/mL.

$$\text{Total adsorption} = 6.91 \times 3 = 20.73 \mu\text{g}$$

$$\text{Total adsorption of CQD per } \mu\text{L of chloroplast} = 20.73/20 = 1.036 \mu\text{g}$$

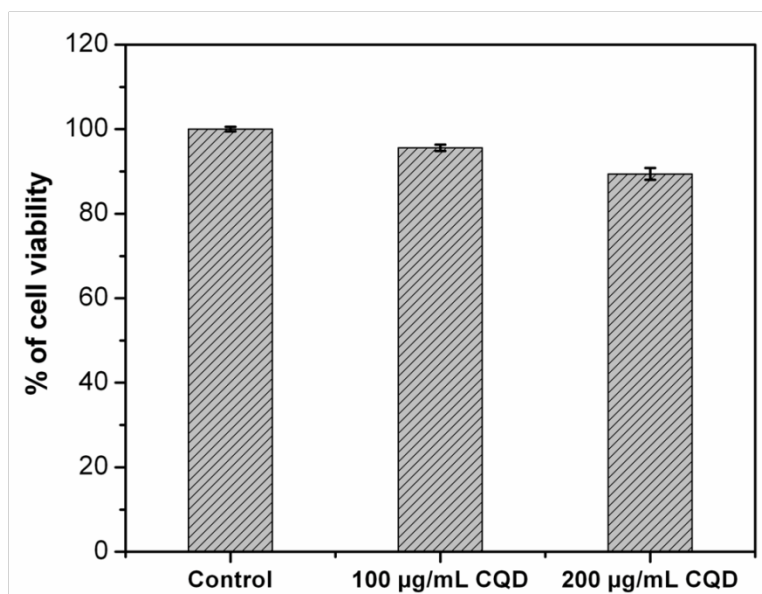


Figure S18 MTT assay on human breast carcinoma HBL-100 cell lines; CQD at highest concentration do not exhibit any toxicity with respect to control.