Supporting Information

PVA Coated Fluorescent Carbon Dots Nanocapsule as Optical Amplifier for Enhanced Photosynthesis of Lettuce

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Number of pages：6

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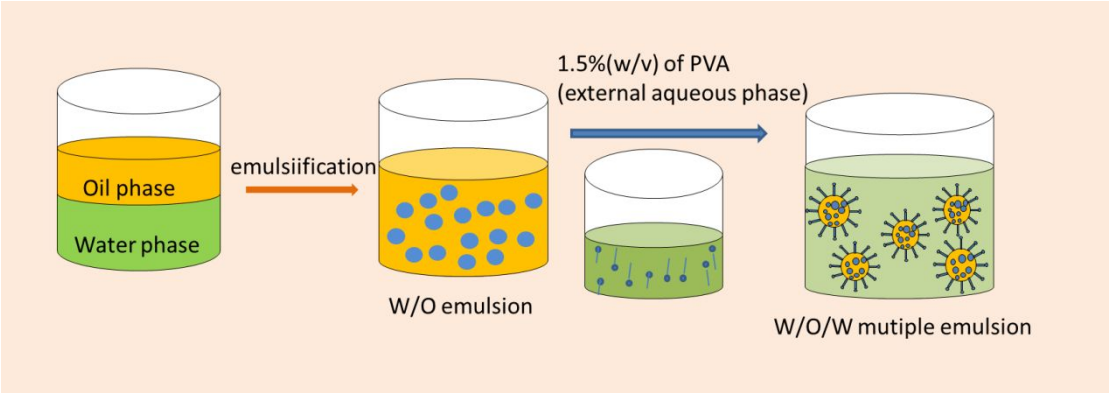

Figure S1. Schematic illustration of the synthesis of CDs microcapsules.

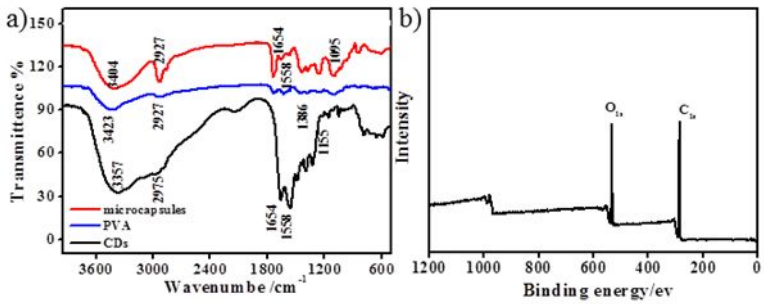

Figure S2. a) FTIR spectra of CDs, PVA, CDs microcapsules. b) XPS of CDs microcapsules.

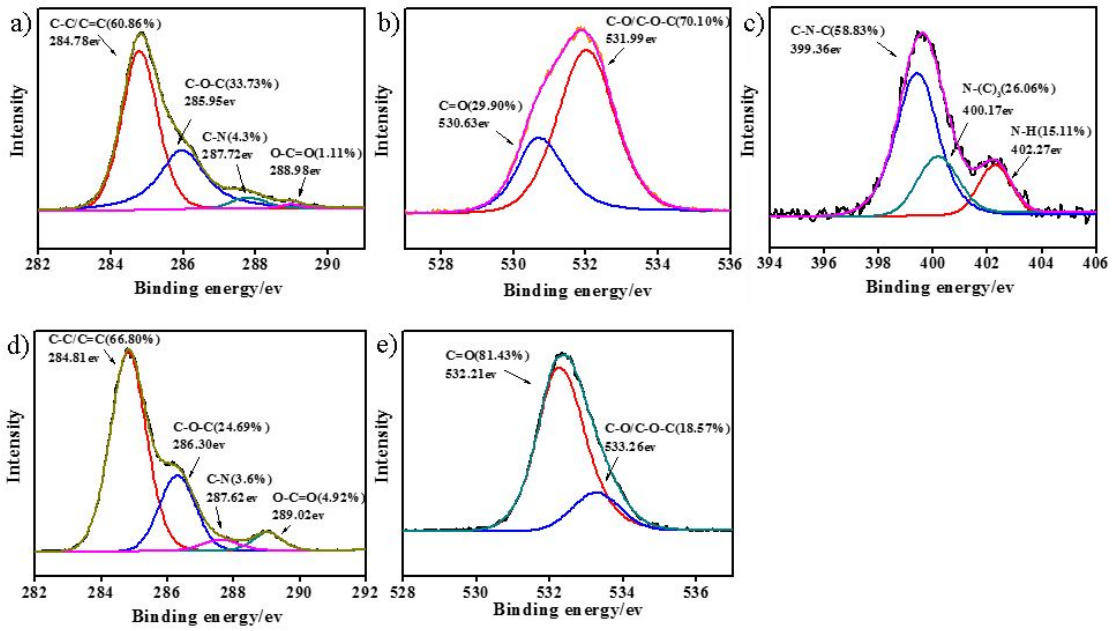

Figure S3. a) C_{1s}, b) O_{1s}, c) N_{1s} spectra of CDs. d) C_{1s}, e) O_{1s} spectra of CDs microcapsules.

Table S1. Fit parameters of the PL decay curves of CDs aqueous solution and CDs microcapsules, respectively.

Samples	τ_1	τ_2	τ_3	τ_{avg}	$k_r(10^7 s^{-1})$	$k_{nr}(10^8 s^{-1})$
CD1(0.1mg/mL)	2.760	10.441		9.973	3.891	0.614
CD2(0.2mg/mL)	0.114	2.213	10.018	9.747	5.037	0.522
CD3(0.3mg/mL)	0.0771	9.882		9.974	7.299	0.273
CD4(0.4mg/mL)	0.230	3.556	10.074	9.305	3.278	0.747
CDs	0.00516	12.068		12.055	5.483	0.281

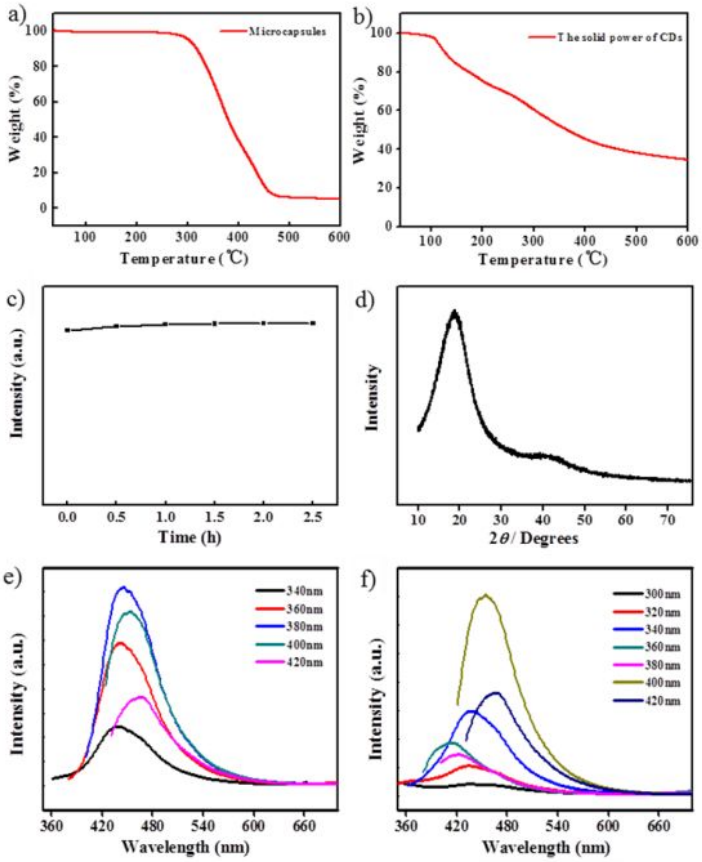

Figure S4. a) TGA curves of CDs microcapsules synthesized in 0.3mg/mL CDs aqueous solution. b) TGA curves of solid powder of CDs. c) Photostability of CDs microcapsules synthesized in 0.3mg/mL CDs aqueous solution, excited at 360 nm. d) The powder XRD pattern of CDs microcapsules synthesized in 0.3mg/mL CDs aqueous solution. e,f) PL emission spectra of the CDs microcapsules synthesized in 0.3mg/mL CDs aqueous solution and unencapsuled CDs with the excitation wavelengths changing from 340 to 420 nm.

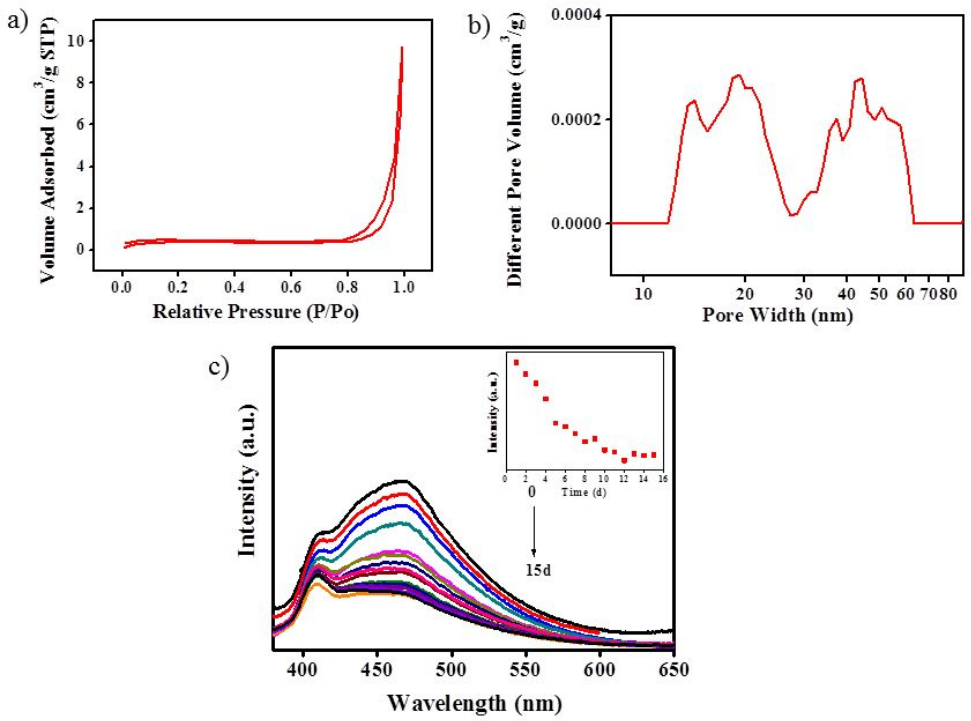

Figure S5. a) Nitrogen absorption-desorption isotherms of CDs nanocapsule. b) Pore-size distribution curves of CDs nanocapsule. c) Fluorescence spectra of CDs from CDs nanocapsule, excited at 360 nm, collected every other day within 15 d. Inset: Plots of integrated PL intensity of CDs from CDs nanocapsule.

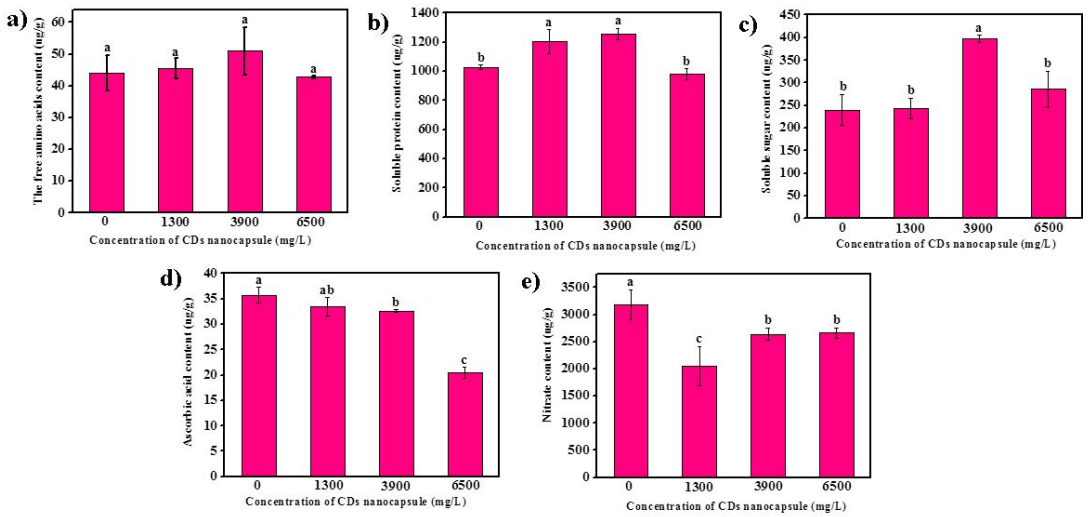

Figure S6. Nutrition quality under different concentration of CDs nanocapsule. a) The free amino acid content, b) Soluble protein content, c) Soluble sugar content, d) Ascorbic acid content. e) Nitrate content.