Supporting Information

Recovery of chlorophyll *a* derivative from *Spirulina maxima*, its purification and photosensitizing potential

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This document comprises: Pages: 11; Figures: 12; Tables: 2.

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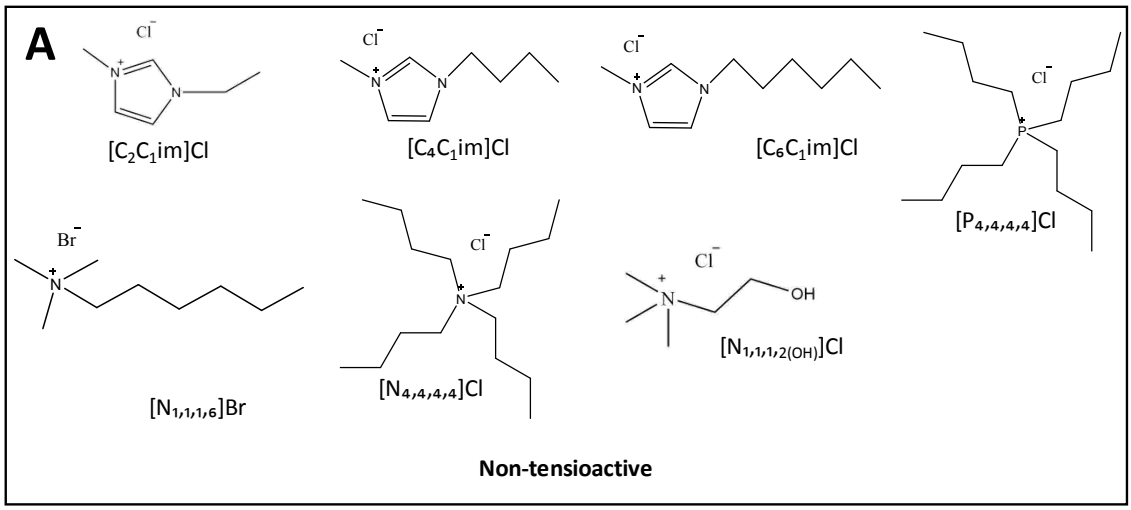
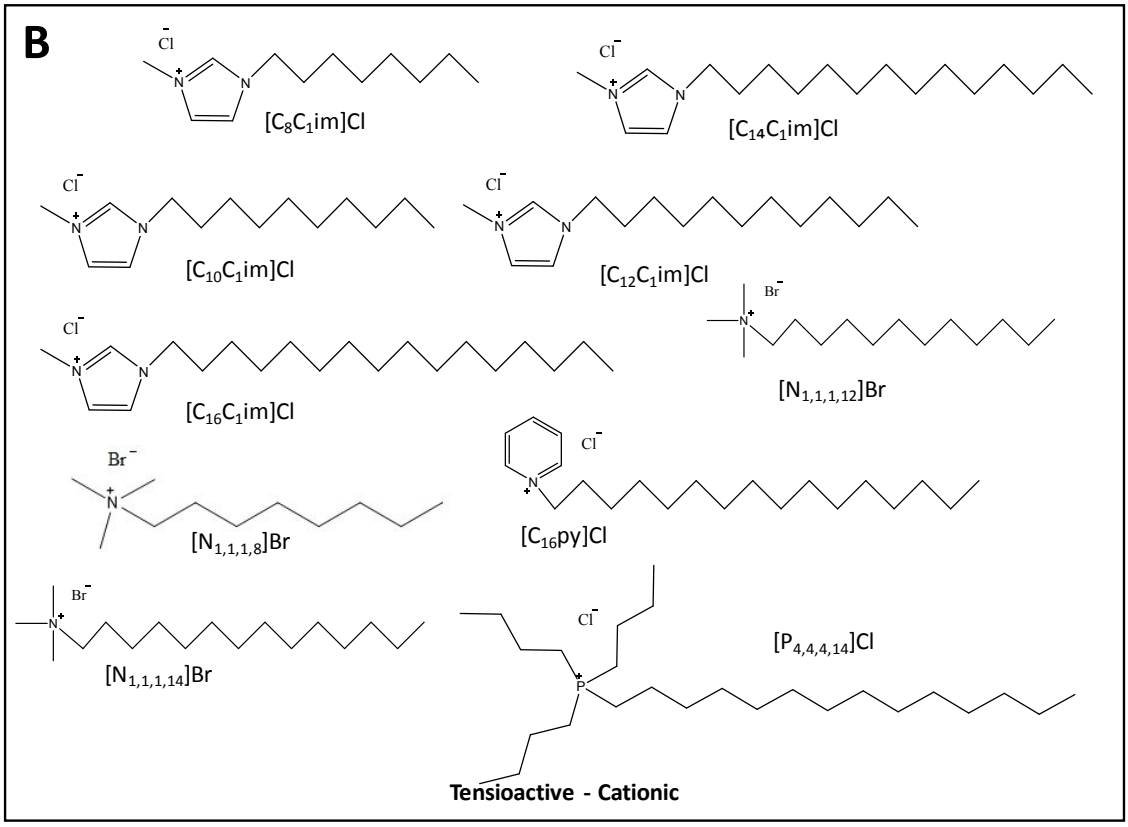

A
[C2C1im]Cl
[C4C1im]Cl
[C6C1im]Cl
[P4,4,4,4]Cl
[N1,1,1,6]Br
[N4,4,4,4]Cl
[N1,1,1,2(OH)]Cl
Non-tensioactive


B
[C8C1im]Cl
[C14C1im]Cl
[C10C1im]Cl
[C12C1im]Cl
[N1,1,1,12]Br
[C16C1im]Cl
[N1,1,1,8]Br
[C16py]Cl
[N1,1,1,14]Br
[P4,4,4,14]Cl
Tensioactive - Cationic

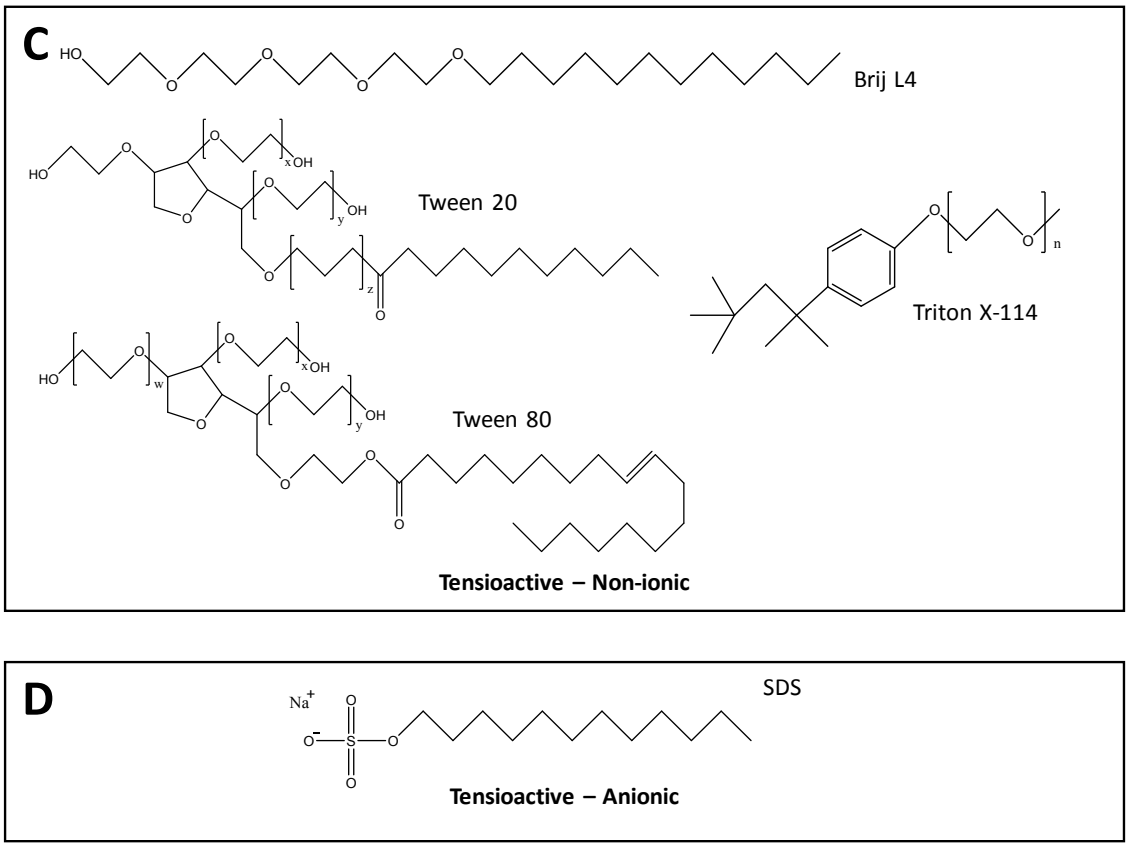


Figure S1. Molecular structure of the ILs and common surfactants screened in this work: (A) non-tensioactive compounds, (B) cationic tensioactive compounds, (C) non-ionic tensioactive compounds, and (D) anionic tensioactive compounds.

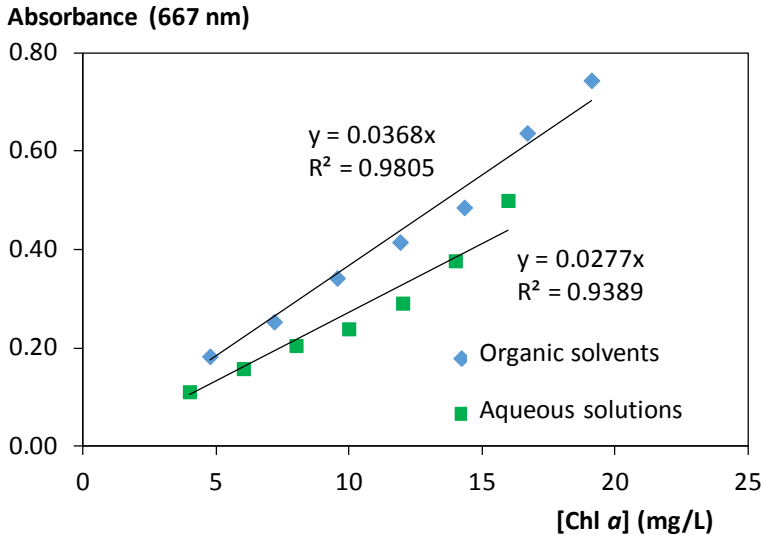


Figure S2. Calibration curves experimentally determined and used to quatify chlorophyll in organic solvents and aqueous solutions using t

he Synergy HT microplate reader – BioTek.

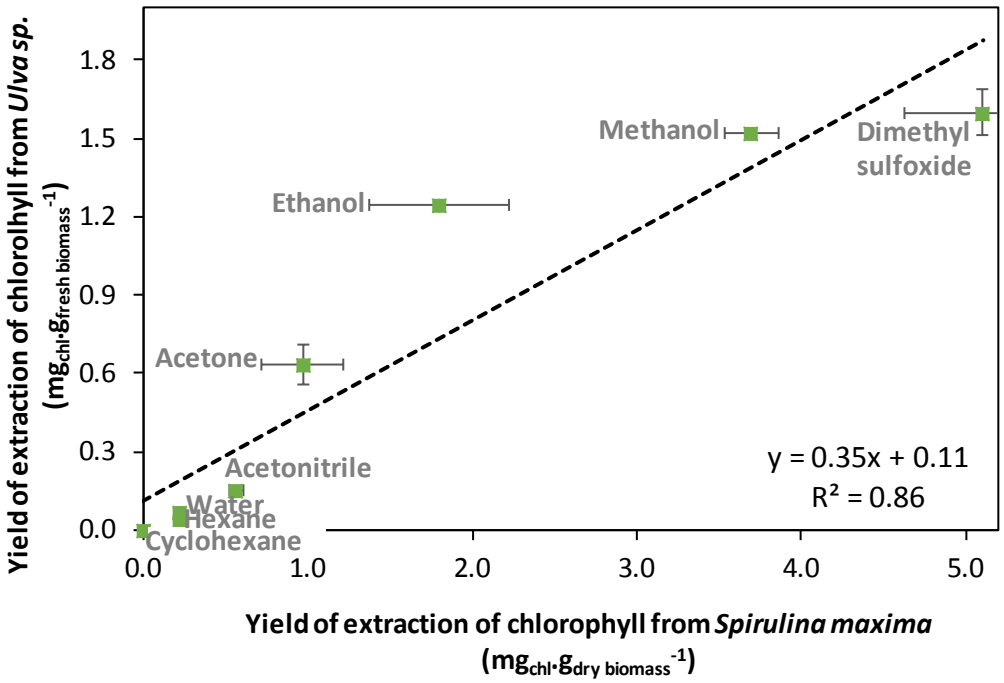


Figure S3. Correlation between the yields of chlorophyll extracted from *Ulva rigida*[1] and *Spirulina maxima* using the same solvents.

Table S1. Real and coded values of the optimization process expressed by the yields of chlorophyll extracted from *Spirulina maxima* by CCRD 2^2 using methanol as solvent.

	Design Matrix		Experimental conditions		Yield of extraction ($mg_{chl}.g_{dry\ biomass}^{-1}$)
Run	Time	Solid-liquid ratio	Time (min)	Solid-liquid ratio ($g_{dry\ biomass}.mL_{solvent}^{-1}$)	
1	-1	-1	28	0.030	2.698
2	1	-1	62	0.030	2.823
3	-1	1	28	0.055	1.837
4	1	1	62	0.055	2.287
5	-1.41	0	21	0.045	1.788
6	1.41	0	69	0.045	2.724
7	0	-1.41	45	0.024	3.052
8	0	1.41	45	0.059	1.869
9	0	0	45	0.045	2.350
10	0	0	45	0.045	2.731
11	0	0	45	0.045	2.510

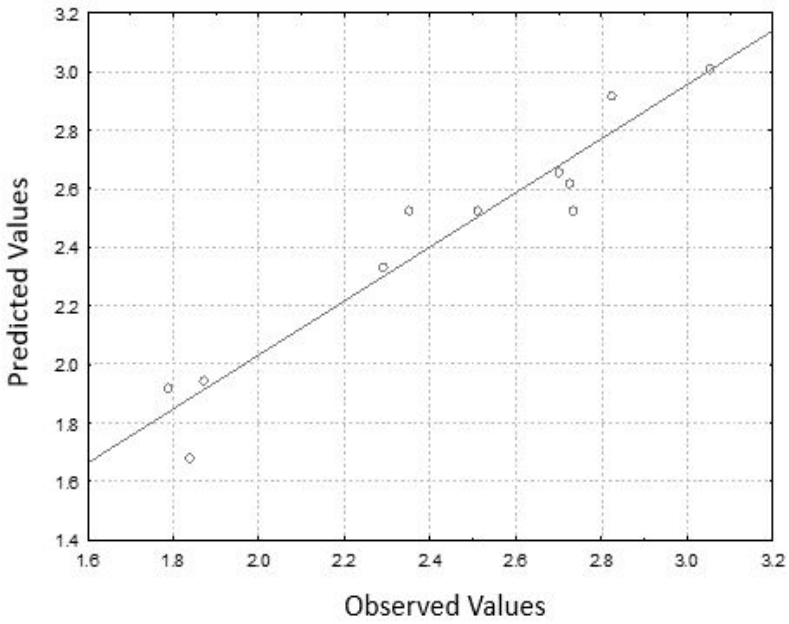


Figure S4. Predicted *vs.* experimental values of the CCRD (2^2) regarding the yield of chlorophyll using methanol.

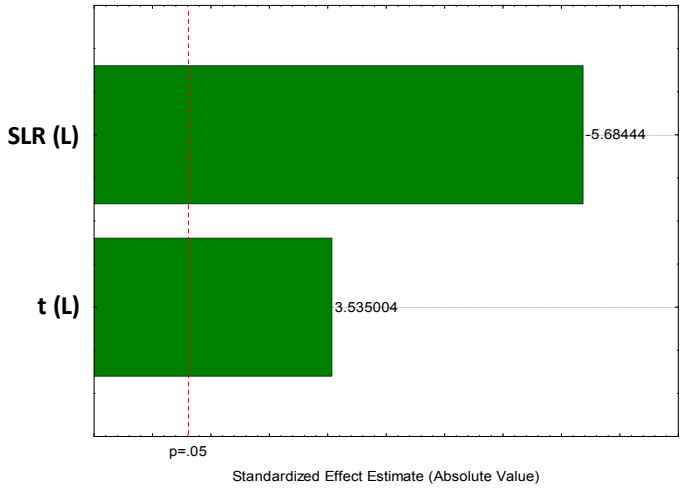


Figure S5. Pareto's chart of the CCRD regarding the yield of chlorophyll using methanol as solvent.

Table S2. Critical micellar concentration (CMC) values of the used tensioactive compounds.

Tensioactive compound	CMC (mM)	Reference
$[C_8C_1im]Cl$	220	2
$[C_{10}C_1im]Cl$	55	2
$[C_{12}C_1im]Cl$	15	2
$[C_{14}C_1im]Cl$	4	2
$[C_{16}C_1im]Cl$	1.26	3
$[N_{1,1,1,8}]Cl$	39.8	4
$[N_{1,1,1,12}]Br$	15.6	5
$[N_{1,1,1,14}]Br$	3.8	5
$[C_{16}py]Cl$	0.96	6
$[P_{4,4,4,14}]Cl$	4.69	4
SDS	8	2
Brij L4	n.d.	-
Triton X-114	0.168	7
Tween 20	0.050	7
Tween 80	0.010	7

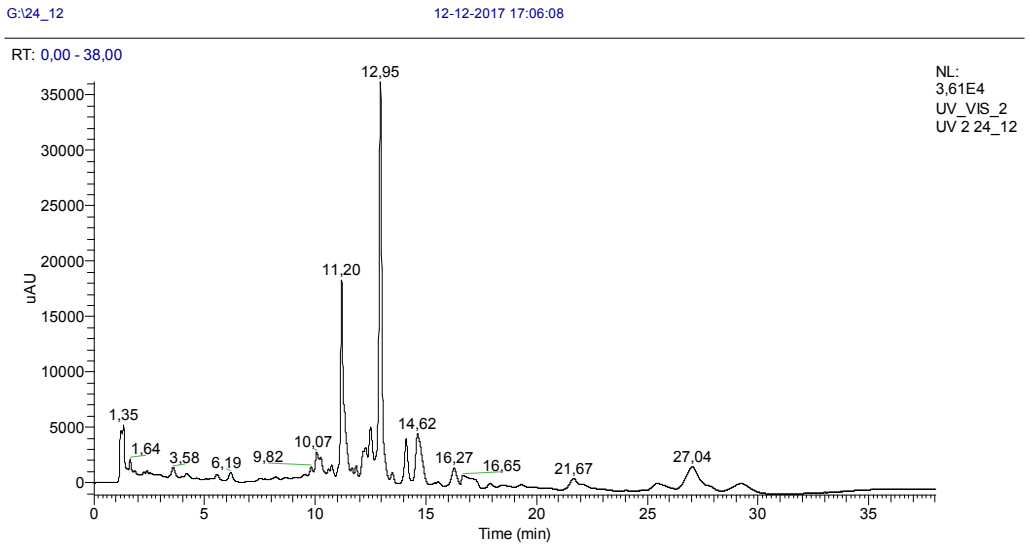


Figure S6. UHPLC chromatogram of the methanol-based extract, recorded at 305 nm.

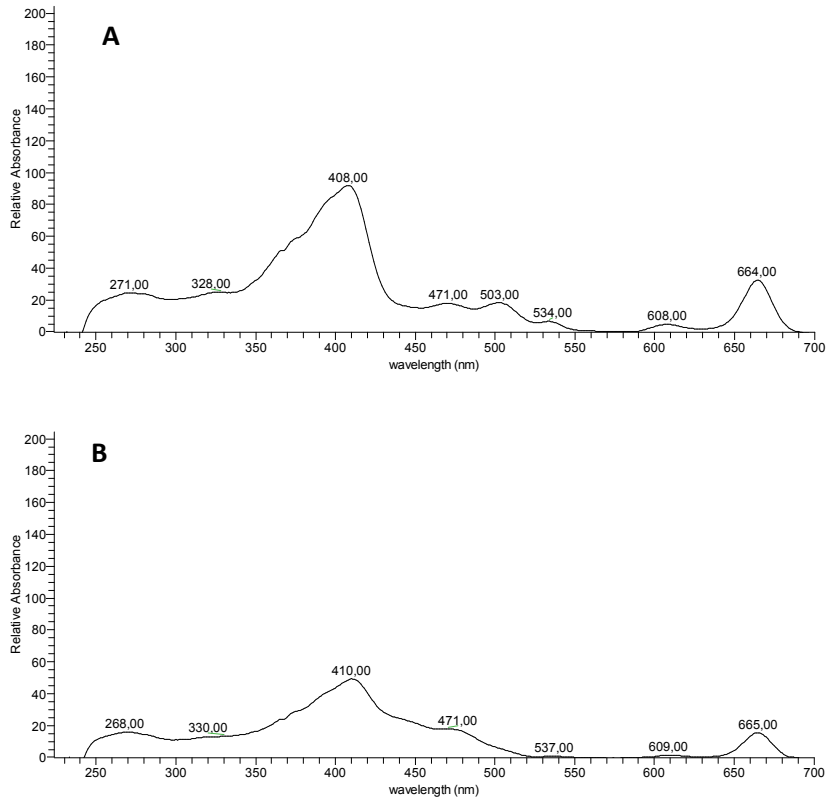


Figure S7. UV-Vis spectra of the methanol-based extract considering the peaks at (A) 11.20 min and (B) 12.95 min.

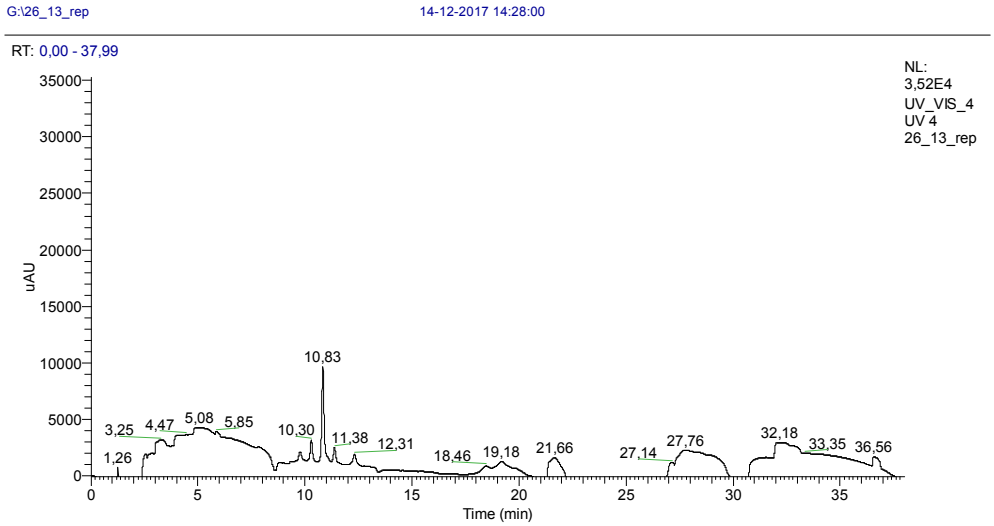


Figure S8. UHPLC chromatogram of the 1st and 2nd fractions of back extraction (obtained from alternative extraction), recorded at 430 nm.

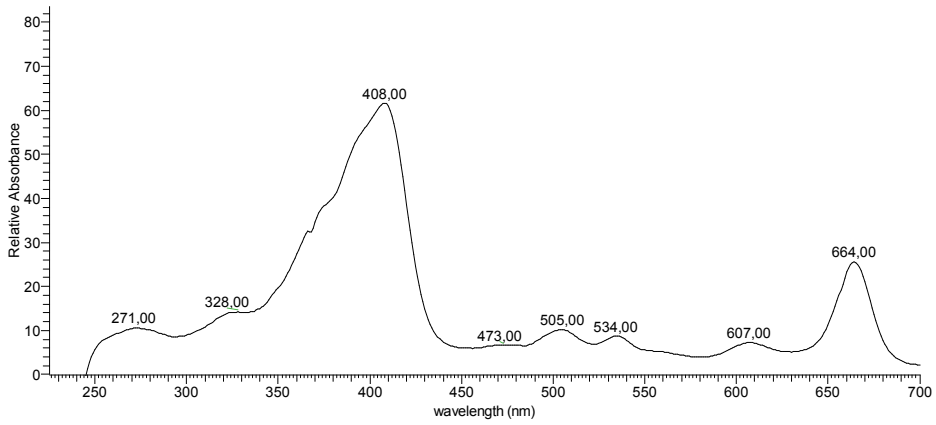


Figure S9. UV-Vis spectra of the 1st and 2nd fractions of back extraction (obtained from alternative extraction) considering the peak at 10.83 min.

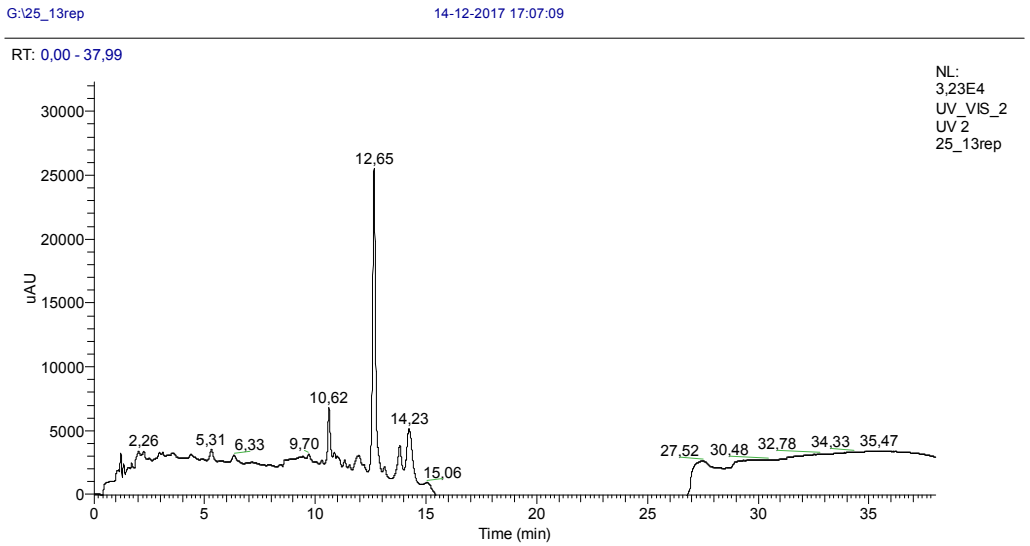


Figure S10. UHPLC chromatogram of the 3rd fraction of back extraction (obtained from alternative extraction), recorded at 305 nm.

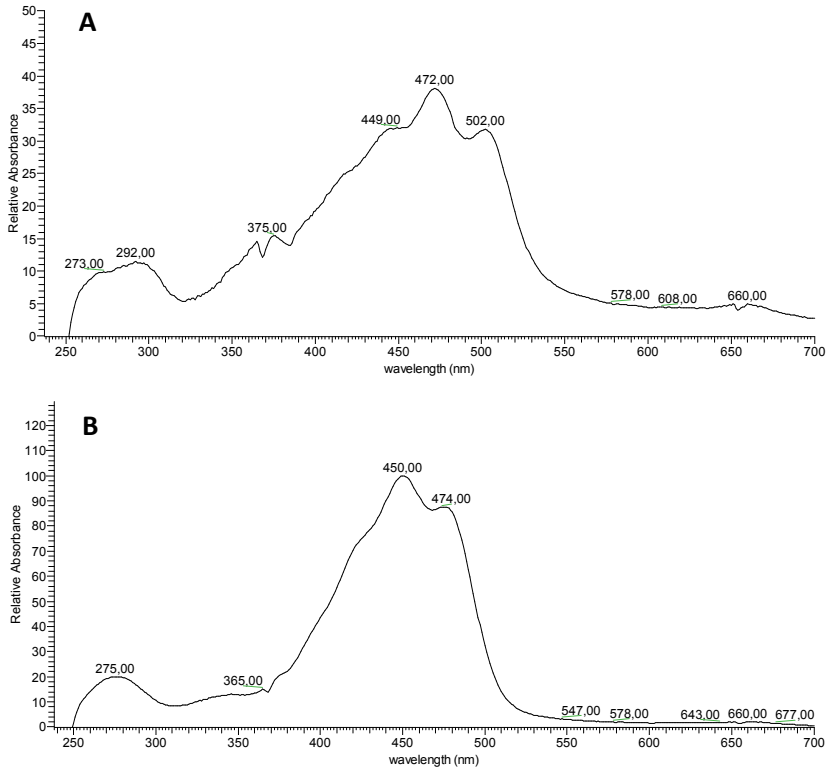


Figure S11. UV-Vis spectra of the 3rd fraction of back extraction (obtained from alternative extraction) considering the peaks at (A) 10.62 min and (B) 12.65 min.

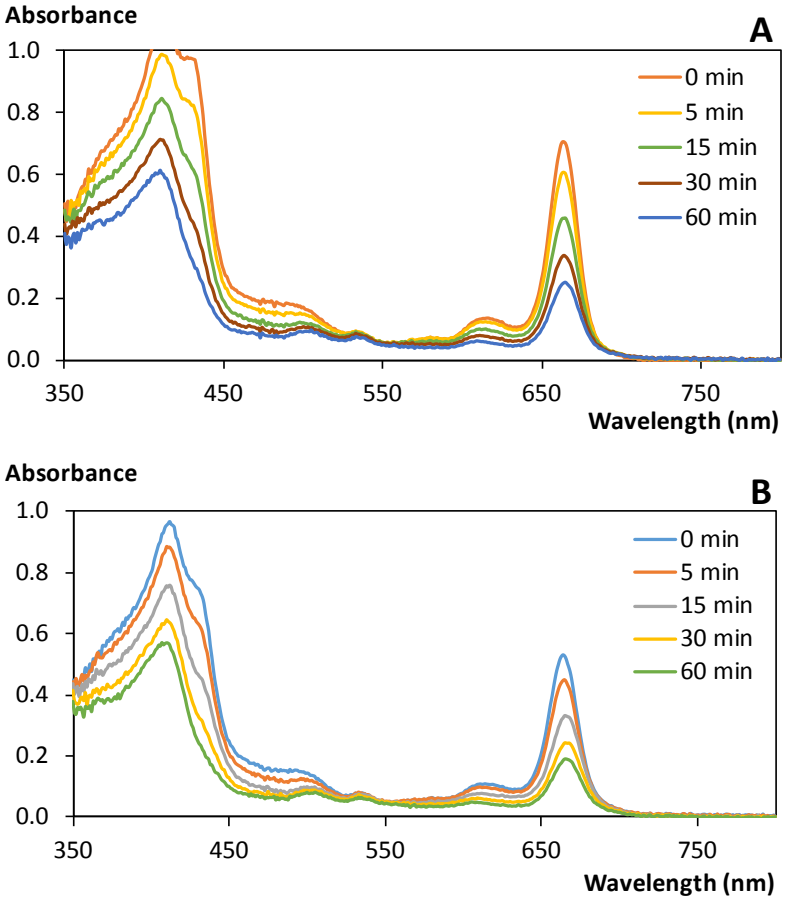


Figure S12. UV-Vis spectra of the (A) methanol-based extract and (B) 1st and 2nd fractions of back extraction (obtained from alternative extraction) along the irration period in the photostability assays.

References

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