Supporting Information

Natural Porphyrins Accelerating the Phototransformation of Benzo[a]pyrene in Water

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Table S1 Retention time, qualitative and quantitative ions, and collision energy for the standard of BaP transformation products

Name	Retention time (min)	Qualitative and quantitative ions[b] (*m/z*)	Collision Energy (ev)
BaP-*cis*-4,5-diol	1.63	269, 268, 252, <u>239</u>	35
BaP-1, 6-dione	2.35	283, 255, 227, <u>226</u>	45
BaP-3, 6-dione	2.47	283, 255, 227, <u>226</u>	43
BaP-6, 12-dione	2.82	283, 255, 227, <u>226</u>	44
1-OH-BaP	3.69[a]	269, <u>268</u>, 252, 239	26
3-OH-BaP	3.69[a]	269, <u>268</u>, 252, 239	28

[a] 1-OH-BaP and 3-OH-BaP could not be separated.

[b] Underline ion means quantitative ion.

Table S2 BaP phototransformation rate constants (*k*) and half-lives ($t_{1/2}$) in the various porphyrins treatments.

Treatments	*k* (d^{-1})	R^2	$t_{1/2}$ (d)
Control	0.0178	0.7256	38.9
Sodium copper chlorophyllin	0.0061	0.5177	113.6
Hematin	0.041	0.9828	16.9
Pheophorbide *a*	0.178	0.8827	3.89
Cobalamin	0.203	0.9399	3.41
Chlorophyll *a*	0.395	0.9409	1.76

Table S3 Porphyrins photodegaradation rate constants (*k*) and half-lives ($t_{1/2}$) under light irradiation.

Porphyrins	*k* (d^{-1})	R^2	$t_{1/2}$ (d)
Sodium copper chlorophyllin	0.0502	0.7459	13.8
Hematin	0.0644	0.9972	10.7
Pheophorbide *a*	0.148	0.9269	4.67
Cobalamin	0.129	0.9447	5.37
Chlorophyll *a*	0.798	0.9997	0.87

Table S4 Correlation analysis between the BaP transformation percentage and the production of $^1O_2$

Treatment	Pearson's r	*p*
Control	0.474	0.099
Chlorophyll *a*	0.987**	0.000
Cobalamin	0.918**	0.000
Pheophorbide *a*	0.936**	0.000
Hematin	0.915**	0.001
Sodium copper chlorophyllin	0.623*	0.036

*Correlation is significant at the 0.05 level (1-tailed)

**Correlation is significant at the 0.01 level (1-tailed)

Figure S1 Structures of natural porphyrins

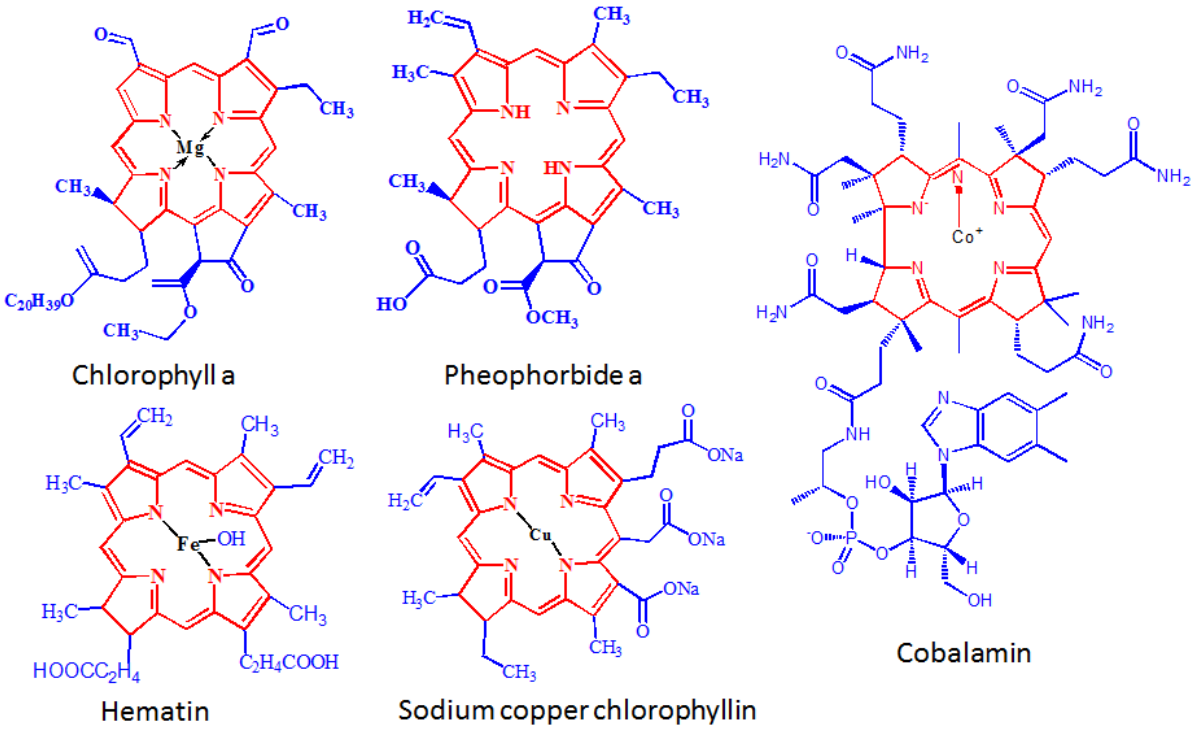

Figure S2 Effect of chlorophyll *a* on BaP phototransformation when chlorophyll *a* was irradiated under light for 4 days

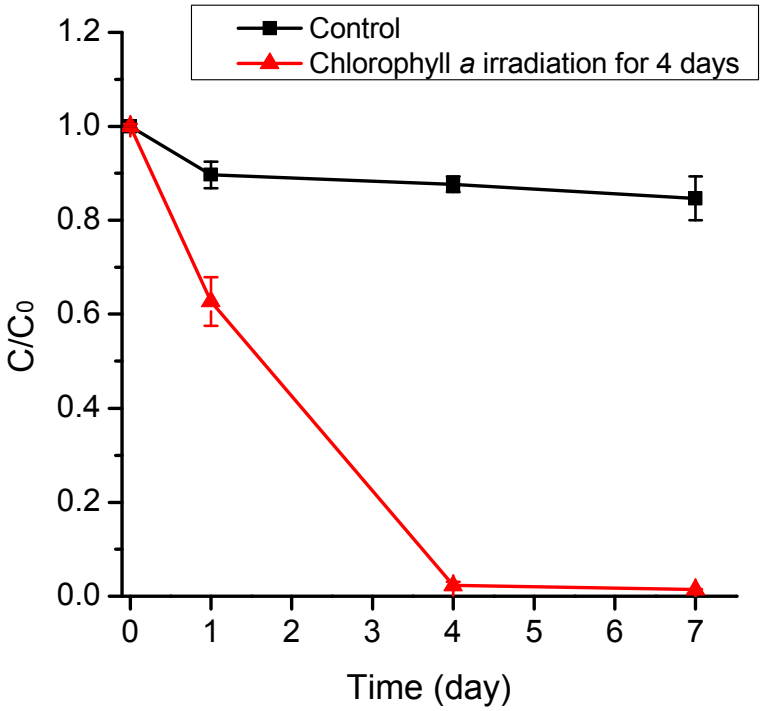

Figure S3 Effect of chlorophyll *a* concentration on the production of •OH

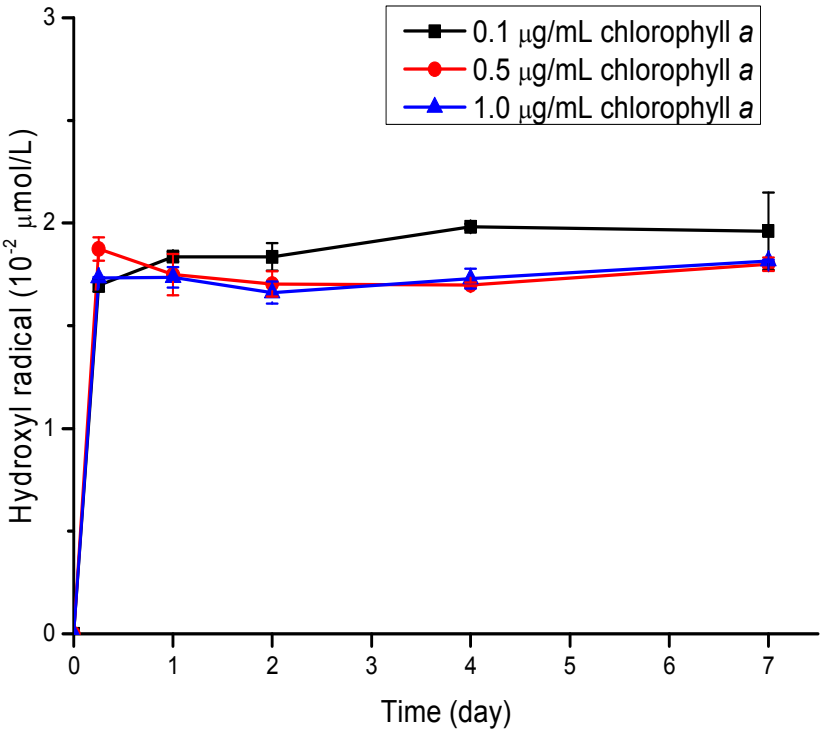

Figure S4 Relative percentages of BaP transformation products in different porphyrins treatments during 7 days irradiation. D1, D4 and D7 represent Days 1, 4 and 7, respectively.

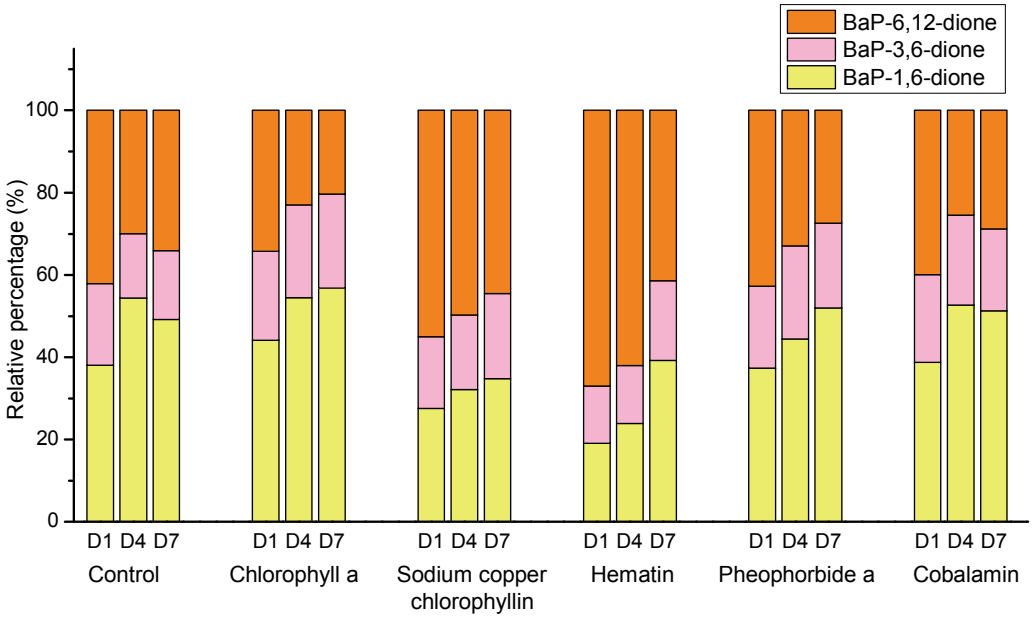

Figure S5 Effect of salinity on BaP phototransformation by chlorophyll *a* at Day 4.