Supplementary Information (SI) for Environmental Science: Water Research & Technology.

Supplementary Information

Microcystin-LR removal by powdered activated carbon: The influence of background organic matter under non-bloom and bloom conditions

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Contains: 18 total pages, 13 figures, and 9 tables

SI-1. Spectrophotometric determination of Chlorophyll *a* (Chl-*a*)

A spectrophotometric method was used for the determination of Chlorophyll *a* present in planktonic algae of surface waters at a concentration of 1 to 300 mg/m^3. The principle of the method is based on the extraction of pigments from plankton concentrate with an aqueous solution of acetone and determines the optical density (absorbance) of the extract using a spectrophotometer.

References:

- American Public Health Association (Ed.) (2005). Standard Methods for the Examination of Water and Wastewater (21st ed.). American Water Works Association & Water Environment Federation, Washington, DC. - Standard Method 10200-H. *Spectrophotometric Determination of Chlorophyll - Standard Methods for the Examination of Water and Wastewater*.

SI-2. Preparation of samples for taxonomy and enumeration analysis

After collecting the raw water samples from the reservoir and transporting them to the laboratory, samples were prepared for taxonomy and enumeration analysis. 200-250 mL glass bottles with a PTFE septum stopper were used. Water was preserved with Lugol's iodine solution (0.5 – 1 ml, i.e. 10 - 20 drops) until the water color turned dark yellow (colour of weak tee or cognac). During transport, the samples were not be exposed to direct sunlight. Lugol's iodine preserved samples were stored in a cool (1℃ - 4℃) and dark place in an upright position until they were measured.

References:

- American Public Health Association (Ed.) (2005). Standard Methods for the Examination of Water and Wastewater (21st ed.). American Water Works Association & Water Environment Federation, Washington, DC. - Standard Method 10200-B. *Plankton. Sample Collection - Standard Methods for the Examination of Water and Wastewater*.

SI-3. Enumeration analysis of phytoplankton for raw water samples

The quantitative and qualitative analysis of phytoplankton was based on Utermöhl's method which used an inverted microscope and cylindrical sedimentation chambers.
The analysis was performed by an external laboratory: Stillwater Environmental, Paris Ontario.

References:

- Findlay, D. L., & Kling, H. J. (2001). Protocols for measuring biodiversity: phytoplankton in freshwater. *Winnipeg: Department of Fisheries and Oceans*.
- Hopkins, G.J, & Standke, S.J. (1992). Phytoplankton methods manual: with special emphasis on waterworks operation internal methods manual. Limnology Section Water Resources Branch, Ontario Ministry of the Environment, Toronto. ISBN 0-7729-8923-0)
- Padisák, J., Chorus, I., Welker, M., Maršálek, B., & Kurmayer, R. (2021). Laboratory analyses of cyanobacteria and water chemistry. *Toxic Cyanobacteria in Water. A Guide to Their Public Health Consequences, Monitoring and Management,*, 689-743.

Table S1. Taxonomy and abundance of algal species in non-bloom water sample (July 6th, 2021)

Algae type	Kingdom	Phylum	Class	Order	Family	Species Name (Authority name)	Density* (cell/L)	Total Biovolume* (mm^3/m^3)
Cyanobacteria	Eubacteria	Cyanobacteria	Cyanophyceae	Chroococcales	Microcystaceae	*Microcystis aeruginosa*	$5.82 \cdot 10^4$	53.76
				Nostocales	Aphanizomenonaceae	*Aphanizomenon flosaquae*	$5.20 \cdot 10^5$	1655.03
Green algae	Plantae	Chlorophyta	Chlorophyceae	Sphaeropleales	Hydrodictyaceae	*Pediastrum duplex*	$1.67 \cdot 10^3$	0.14
						Pediastrum simplex	$6.67 \cdot 10^2$	0.7
					Scenedesmaceae	*Coelastrum sp.*	$3.87 \cdot 10^5$	759.9
						Scenedesmus sp.	$5.71 \cdot 10^4$	1.93
						Tetrastrum sp.	$1.71 \cdot 10^5$	38.24
				Chlorellales	Oocystaceae	*Crucigeniella sp.*	$2.86 \cdot 10^4$	15.17
			Trebouxiophyceae	Chlorellales	Oocystaceae	*Oocystis sp.*	$2.52 \cdot 10^5$	13.83
				Prasiolales	Koliellaceae	*Koliella sp.*	$2.86 \cdot 10^4$	0.19
		Charophyta	Zygnematophyceae	Desmidiales	Closteriaceae	*Closterium parvulum*	$1.33 \cdot 10^3$	0.42
Cryptophyta	Chromista	Cryptophyta	Cryptophyceae	Cryptomonadales	Cryptomonadaceae	*Cryptomonas ovata*	$1.95 \cdot 10^5$	34.57
				Pyrenomonadales	Pyrenomonadaceae	*Rhodomonas minuta*	$1.96 \cdot 10^6$	5.76
Diatoms	Chromista	Bacillariophyta	Bacillariophyceae	Aulacoseirales	Aulacoseiraceae	*Aulacoseira granulata*	$4.33 \cdot 10^3$	23.89
				Bacillariales	Bacillariaceae	*Nitzschia sp.*	$2.86 \cdot 10^4$	11.65
				Naviculales	Naviculaceae	*Navicula cryptotenella*	$5.45 \cdot 10^4$	19.54
				Tabellariales	Tabellariaceae	*Asterionella formosa*	$9.67 \cdot 10^3$	24.15
			Mediophyceae	Stephanodiscales	Stephanodiscaceae	*Cyclotella sp.*	$2.78 \cdot 10^5$	58.35
		Ciliophora	Litostomatea	Cyclotrichiida	Mesodiniidae	*Mesodinium rubrum*	$6.67 \cdot 10^2$	57.86
Other	Chromista	Miozoa	Dinophyceae	Conyaulacales	Ceratinaceae	*Ceratium hirundinella*	$2.73 \cdot 10^4$	1488.45

* analysis performed by an external laboratory: Stillwater Environmental, Paris ON, Canada; average values of duplicate samples

Table S2. Taxonomy and abundance of algal species in bloom water sample (Sept 16th, 2021)

Algae type	Kingdom	Phylum	Class	Order	Family	Species Name (Authority Name)	Density* (cell/L)	Total Biovolume* (mm^3/m^3)
Cyanobacteria	Eubacteria	Cyanobacteria	Cyanophyceae	Nostocales	Aphanizomenonaceae	*Aphanizomenon flosaquae*	$1.40 \cdot 10^6$	4442.39
						Dolichospermum sp.	$2.40 \cdot 10^4$	78.62
				Synechococcales	Pseudanabaenaceae	*Pseudanabaena limnetica*	$3.02 \cdot 10^2$	100.14
Green algae	Plantae	Chlorophyta	Chlorophyceae	Sphaeropleales	Hydrodictyaceae	*Pediastrum simplex*	$3.33 \cdot 10^2$	0.31
						Pediastrum duplex	$1.00 \cdot 10^3$	0.09
					Scenedesmaceae	*Scenedesmus sp.*	$5.75 \cdot 10^4$	4.82
			Trebouxiophyceae	Chlorellales	Oocystaceae	*Oocystis sp.*	$4.44 \cdot 10^4$	14.16
				Prasiolales	Koliellaceae	*Koliella sp.*	$2.21 \cdot 10^5$	2.98
		Charophyta	Zygnematophyceae	Desmidiales	Closteriaceae	*Closterium parvulum*	$5.33 \cdot 10^3$	1.68
					Desmidiaceae	*Staurastrum gracile*	$1.00 \cdot 10^3$	5.80
Cryptophyta	Chromista	Cryptophyta	Cryptophyceae	Cryptomonadales	Cryptomonadaceae	*Cryptomonas ovata*	$1.76 \cdot 10^5$	31.31
						Cryptomonas rostratiformis	$1.85 \cdot 10^5$	44.67
				Pyrenomonadales	Pyrenomonadaceae	*Rhodomonas minuta*	$1.73 \cdot 10^5$	0.38
Diatoms	Chromista	Bacillariophyta	Bacillariophyceae	Aulacoseirales	Aulacoseiraceae	*Aulacoseira granulata*	$4.60 \cdot 10^4$	339.08
			Mediophyceae	Stephanodiscales	Stephanodiscaceae	*Stephanodiscus niagarae*	$2.00 \cdot 10^3$	2.79
Other	Chromista	Miozoa	Dinophyceae	Conyaulacales	Ceratinaceae	*Ceratium hirundinella*	$3.33 \cdot 10^2$	18.15

* analysis performed by an external laboratory: Stillwater Environmental, Paris ON, Canada; average values of duplicate samples

SI-4. Water samples collected for analysis

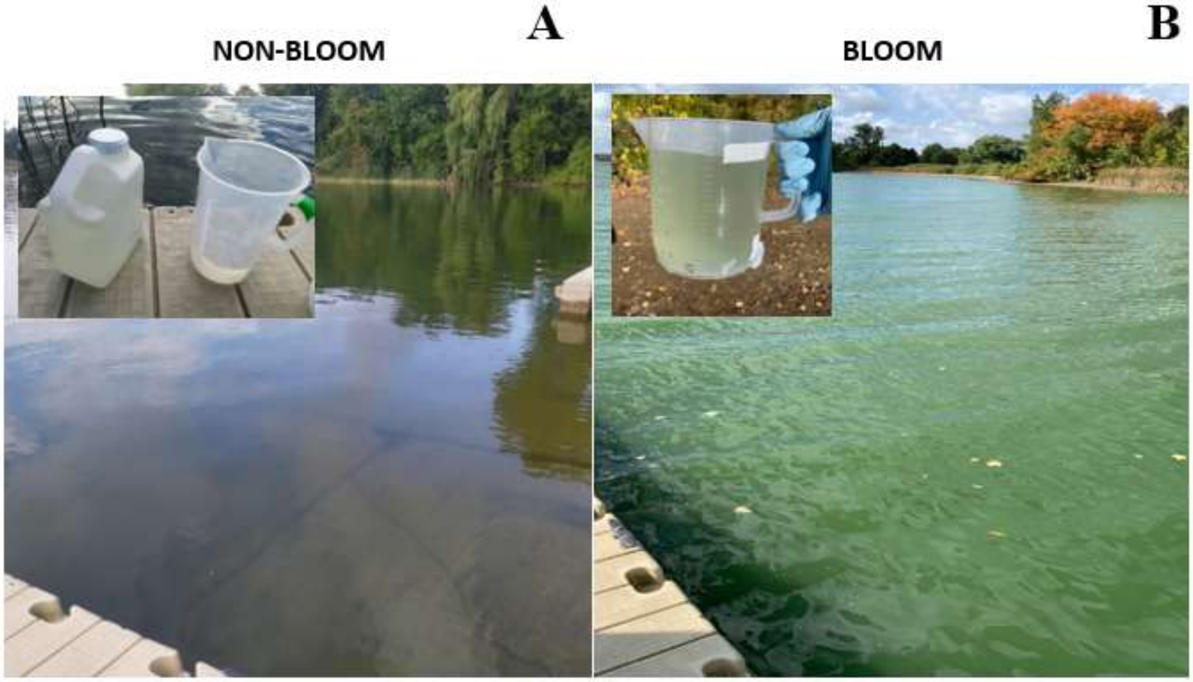

Figure S1. Photographs of the reservoir and raw water samples taken for analysis in non-bloom (A) and bloom (B) conditions.

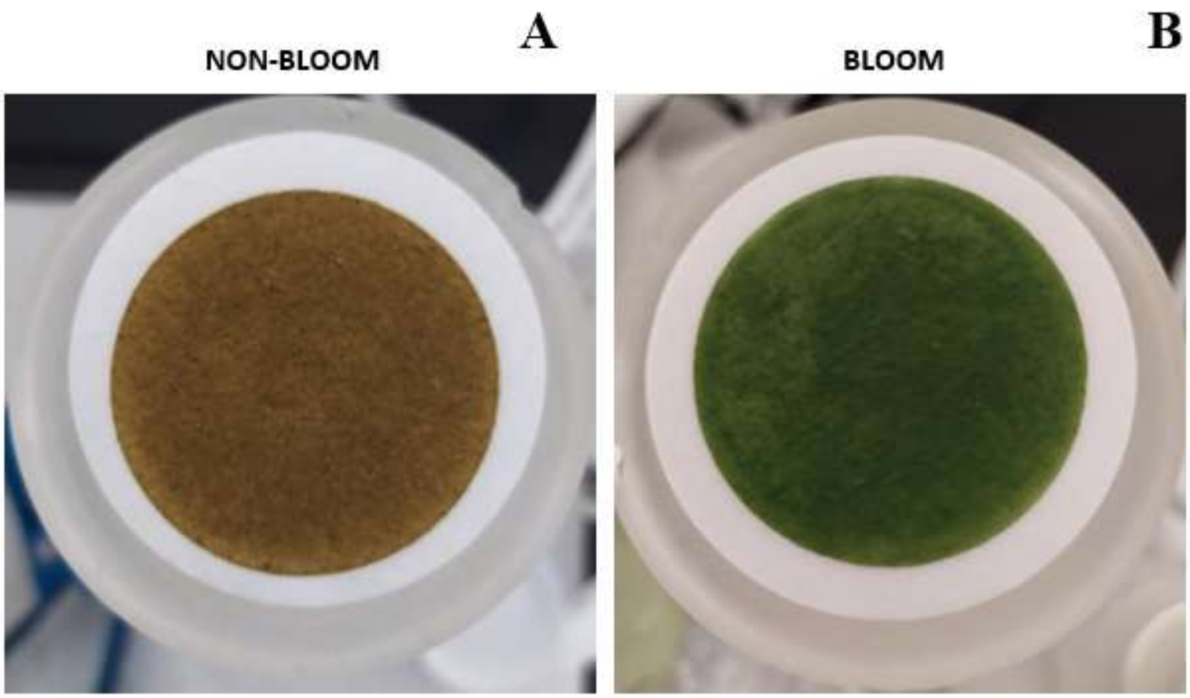

Figure S2. Photographs of glass fibre filters after filtration of non-bloom (A) and bloom (B) raw water samples for Chlorophyll-*a* analysis. The method is shown in SI-1.

SI-5. NOM analysis by LC-OCD of raw and pasteurized water samples

To characterize NOM fractions at non-bloom and bloom conditions, liquid size-exclusion chromatography with organic carbon detection (LC-OCD) technique was used (Huber et al., 2011). Water samples were freshly filtered through 0.45 µm PES filters on the sampling day.

References:

- Huber, S. A., Balz, A., Abert, M., & Pronk, W. (2011). Characterisation of aquatic humic and non-humic matter with size-exclusion chromatography-organic carbon detection-organic nitrogen detection (LC-OCD-OND). *Water research*, *45*(2), 879-885.

Table S3. NOM composition of raw and pasteurized water in non-bloom and bloom conditions

	CDOC	BP	HS	BB	LMA	LMN	DON (in BP)	N/C (in BP)	DON (in HS)	N/C (in HS)	SUVA (HS)	$\overline{Mn}$ (HS)
				mgC/L			mgN/L	mg/mg	mg/L	mgN/m	L/(mg*m)	g/mol
Raw water												
Non-bloom	6.17	0.72	3.42	0.83	0.18	1.01	0.07	0.10	0.26	0.08	3.22	607
Bloom	7.73	1.70	3.78	1.17	0.27	0.81	0.18	0.10	0.36	0.09	3.37	603
Pasteurized water												
Non-bloom	5.92	0.74	3.53	0.78	0.22	0.65	0.05	0.07	0.25	0.09	3.42	568
Bloom	8.82	1.91	4.27	1.29	0.3	1.05	0.18	0.09	0.43	0.1	3.43	582

CDOC: chromatographable DOC; BP: biopolymers; HS: humic substances; BB: building blocks; LMA: low-molecular-weight acids; LMN: low-molecular-weight neutrals; DON: dissolved organic nitrogen; N/C: nitrogen:carbon ratio; SUVA: specific UV absorbance at 25unm; Mn: molecular weight

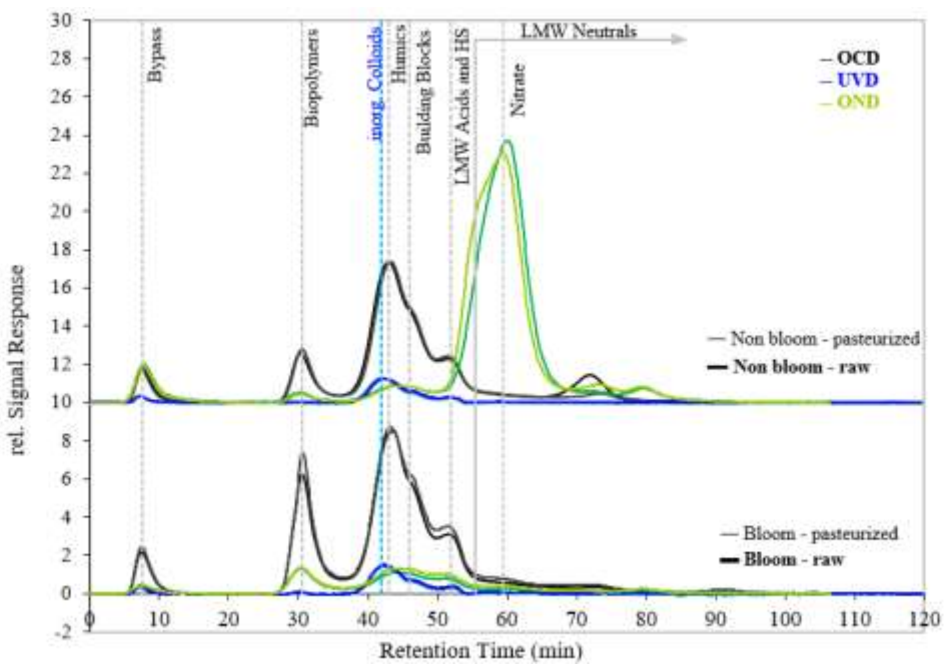

Figure S3. LC-OCD chromatograms of the studied reservoir water in non-bloom and bloom conditions with responses for organic carbon detection (OCD), UV-detection at 254 nm (UVD) and organic nitrogen detection (OND). Offsets in signal response were intentionally made for clarity.

SI-6. MC-LR adsorption analysis

Adsorption capacity

The amount of adsorbed substance, i.e. the adsorption capacity (µg/mg), was calculated on the basis of the mass balance equation (Worch, 2012):

$$q = \frac{(c_0 - c_t) \cdot V}{m} \tag{E1}$$

Where q is the amount of substance adsorbed from the solution (µg/mg), V is the volume of the adsorbate solution (L), c_0 represents an initial MC-LR concentration (µg/L), c_t is MC-LR concentration after adsorption (µg/L) and m represents the mass of the adsorbent (mg).

Freundlich isotherm parameter determination

The experimental data were fitted to the Freundlich equation, which is commonly used for activated carbon adsorption of adsorbates (e.g. Worch, 2012). The equation is given by:

$$q_e = K_F C_e^{\frac{1}{n}} \tag{E2}$$

Where K_F and n are the Freundlich parameters; K_F is a constant that expresses the maximum adsorption on the sorbent surface, the adsorption strength; 1/n illustrates the energetic heterogeneity of the active surface of the adsorbent; q_e represents the solid phase concentration of an adsorbate, c_e represents MC-LR concentration at equilibrium in $\mu g/L$ (Worch, 2012).

Adsorption kinetics

The kinetic experiment data were fitted to the pseudo-first order adsorption equation (proposed by Lagergren) and the pseudo-second-order model - determined by Ho (Simonin, 2016; Ho & McKay, 1998). The two empirical models are curve-fitting relationships describing experimental data and are used to compare adsorption performance.

References:

- Ho, Y. S., & McKay, G. (1999). Pseudo-second order model for sorption processes. *Process biochemistry*, *34*(5), 451-465.
- Simonin, J. P. (2016). On the comparison of pseudo-first order and pseudo-second order rate laws in the modeling of adsorption kinetics. *Chemical Engineering Journal*, *300*, 254-263.
- Worch, E. (2012). Adsorption technology in water treatment. In *Adsorption Technology in Water Treatment*. de Gruyter.

SI-7. Pseudo-first and -second order kinetic models fitting

Both pseudo-first and -second order kinetic models were fit to the MC-LR removal data obtained from the samples with PAC doses 50 and 25mg/L over time using linear fitting.

Table S4. Pseudo-first order kinetic model parameters for PACs (dose 50mg/L) in surface water for non-bloom and bloom water samples

	Carbon	Experimental capacity (µg/mg)	Predicted capacity (µg/mg)	k_1 (h^{-1})	R^2
Non-bloom	coal (COL-PL60-800)	1.93	0.65	0.03	0.88
	wood (BG-HHM)	1.93	0.70	0.67	0.89
	coconut (WPC)	0.79	0.76	0.01	0.91
Bloom	coal (COL-PL60-800)	2.06	0.86	0.02	0.98
	wood (BG-HHM)	2.07	0.46	0.46	0.69
	coconut (WPC)	0.58	0.63	0.01	0.97

Table S5. Pseudo-second order kinetic model parameters for PACs (dose 50mg/L) in surface water for non-bloom and bloom water samples

	Carbon	Experimental capacity (µg/mg)	Predicted capacity (µg/mg)	k_2 (mg/µg/h)	R^2
Non-bloom	coal (COL-PL60-800)	1.93	1.94	1.56	1.00
	wood (BG-HHM)	1.93	1.94	19.9	1.00
	coconut (WPC)	0.77	0.77	0.28	0.99
Bloom	coal (COL-PL60-800)	2.06	2.06	0.60	1.00
	wood (BG-HHM)	2.07	2.07	8.08	1.00
	coconut (WPC)	0.58	0.57	0.48	0.99

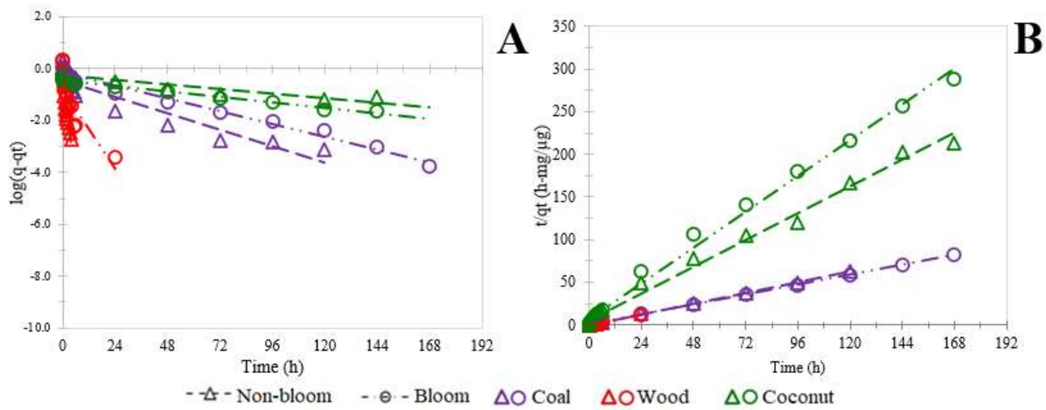

Figure S4. Pseudo-first order (A) and pseudo-second order (B) kinetic model with linear fits of MC-LR adsorption by three PACs in non-bloom and bloom conditions (50mgPAC/L)

Table S6. Pseudo-first order kinetic model parameters for PACs (dose 25mg/L) in surface water for non-bloom and bloom water samples

	Carbon	Experimental capacity (µg/mg)	Predicted capacity (µg/mg)	k_1 (h^{-1})	R^2
Non-bloom	coal (COL-PL60-800)	3.68	2.13	0.03	0.95
	wood (BG-HHM)	3.88	1.60	0.65	0.92
	coconut (WPC)	0.56	0.41	0.02	0.88
Bloom	coal (COL-PL60-800)	3.55	2.29	0.03	0.97
	wood (BG-HHM)	4.14	0.92	0.09	0.84
	coconut (WPC)	0.72	0.39	0.02	0.67

Table S7. Pseudo-second order kinetic model parameters for PACs (dose 25mg/L) in surface water for non-bloom and bloom water samples

	Carbon	Experimental capacity (µg/mg)	Predicted capacity (µg/mg)	k_2 (mg/µg/h)	R^2
Non-bloom	coal (COL-PL60-800)	3.68	3.68	0.10	1.00
	wood (BG-HHM)	3.88	3.95	1.36	1.00
	coconut (WPC)	0.56	0.52	0.28	0.97
Bloom	coal (COL-PL60-800)	3.55	3.50	0.07	1.00
	wood (BG-HHM)	4.14	4.15	0.70	1.00
	coconut (WPC)	0.72	0.70	0.40	0.99

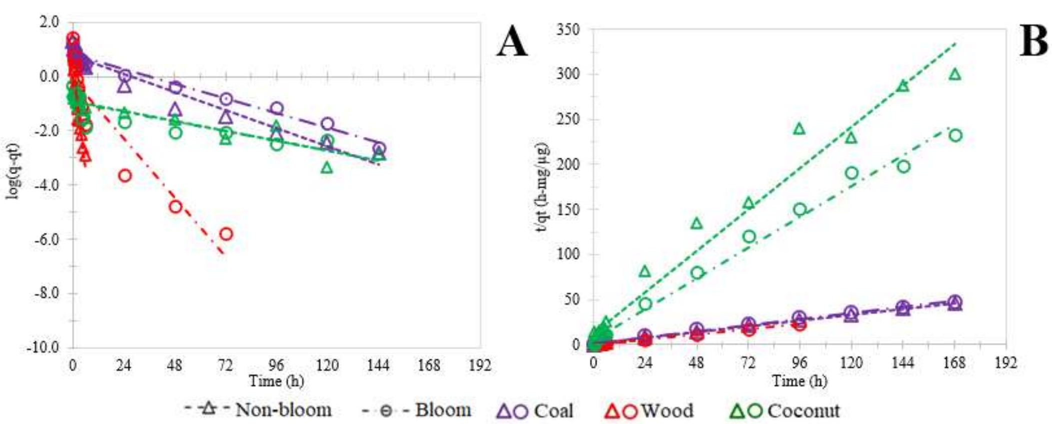

Figure S5. Pseudo-first order (A) and pseudo-second order (B) kinetic model with linear fits of MC-LR adsorption by three PACs in non-bloom and bloom conditions (25mgPAC/L)

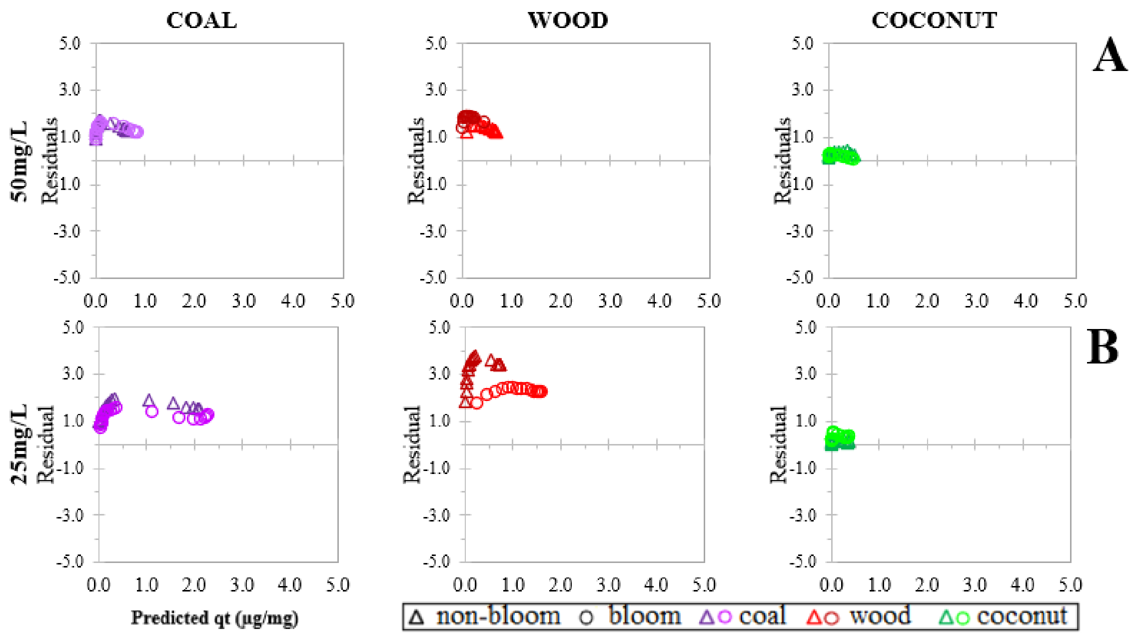

Figure S6. Residual plots for pseudo-first order fit of MC-LR adsorption in non-bloom (triangle markers) and bloom (circle markers) water conditions for 50mgPAC/L (A) and 25mgPAC/L (B)

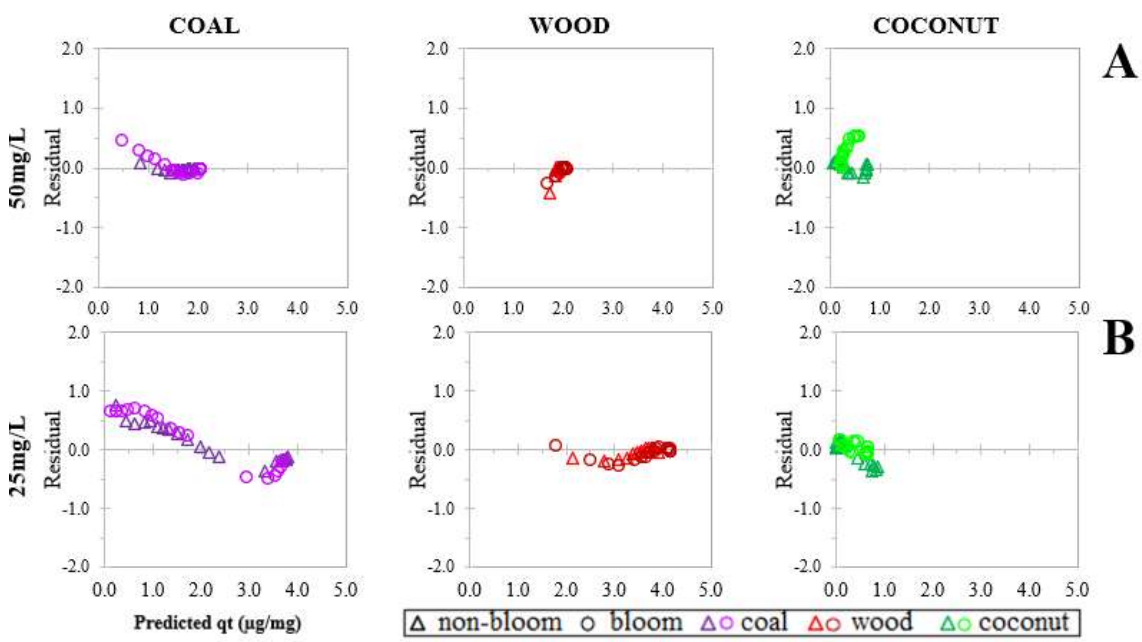

Figure S7. Residual plots for pseudo-second order fit of MC-LR adsorption in non-bloom (triangle markers) and bloom (circle markers) water conditions for 50mgPAC/L (A) and 25mgPAC/L (B)

SI-8. Additional figures: MC-LR adsorption capacity and removal efficiency

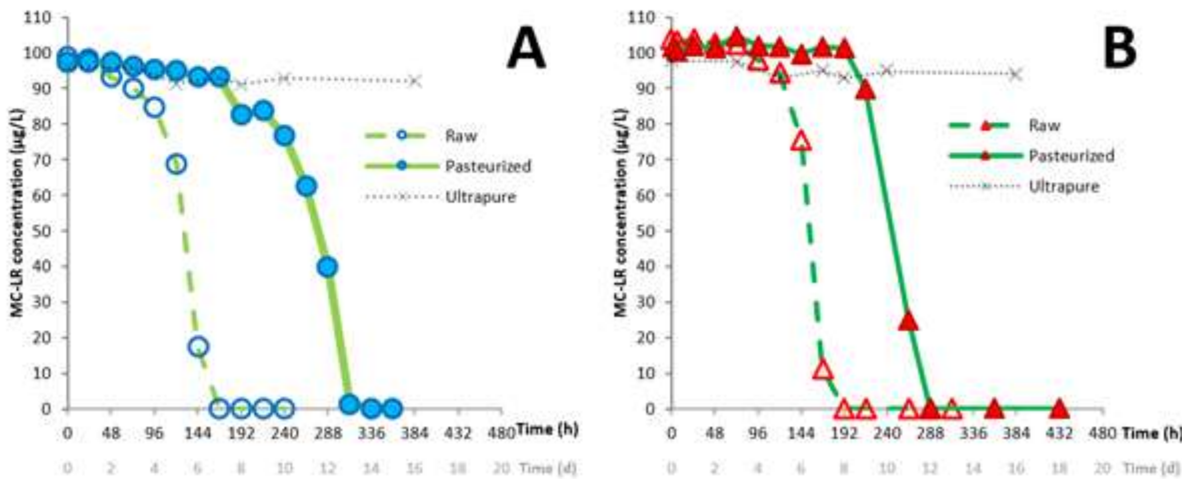

Figure S8. MC-LR concentrations in positive control samples (MC-LR spiked in raw and pasteurized reservoir water, no PAC added) in non-bloom water (A) and bloom water (B).

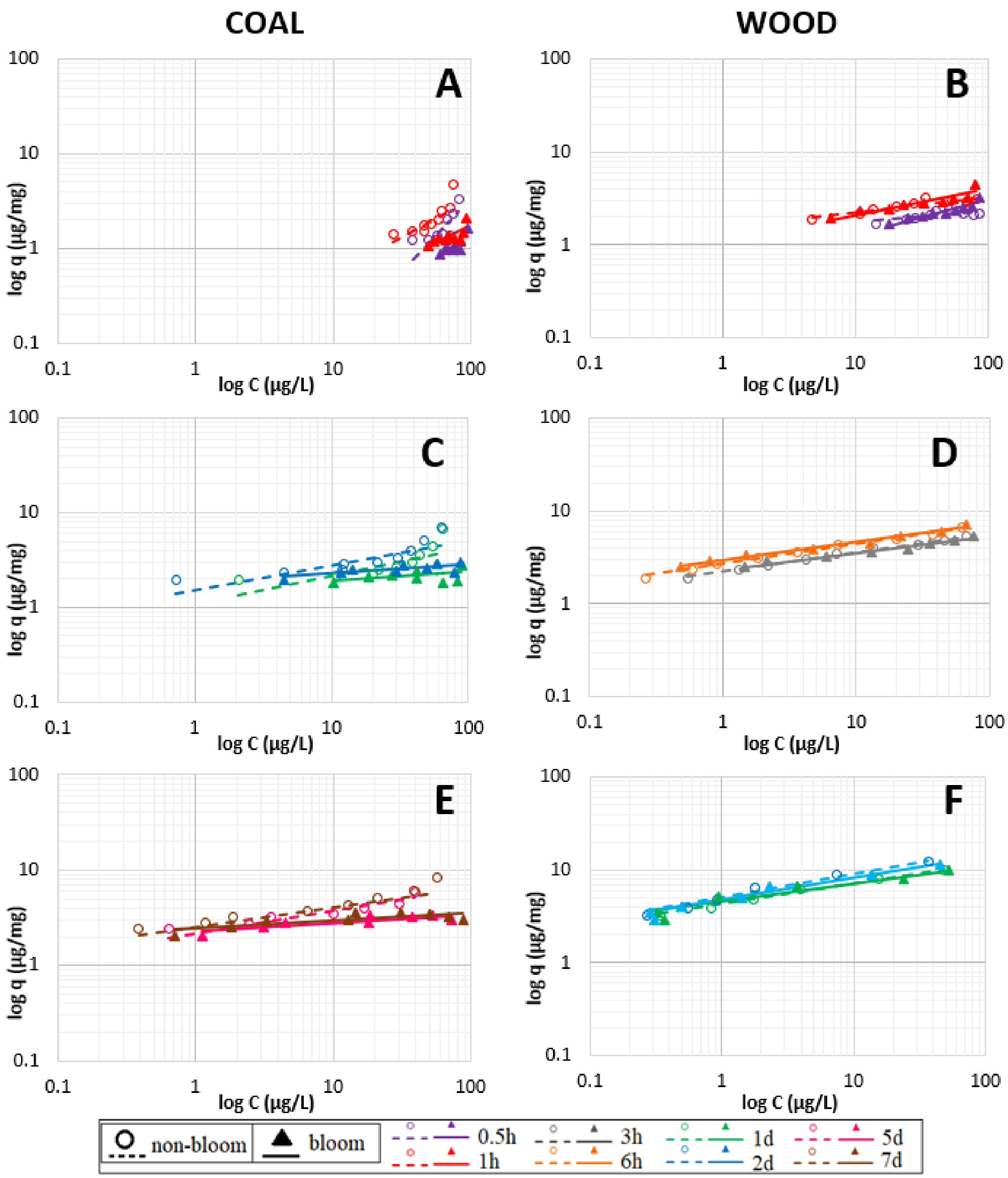

Figure S9. Comparison of adsorption capacities for MC-LR in bloom vs. non-bloom water using coal- (A, C and E) and wood-based (B, D and F) PACs for different adsorption times (top: 0.5 and 1 h; middle: 1 and 2d for coal- and 3 and 6h for wood-based PAC; bottom: 5 and 7d for coal- and 1 and 2d for wood-based PAC) displayed as Freundlich plots

(Initial MC-LR concentration ~100 µg/L; carbon doses 5-50 mgPAC/L)

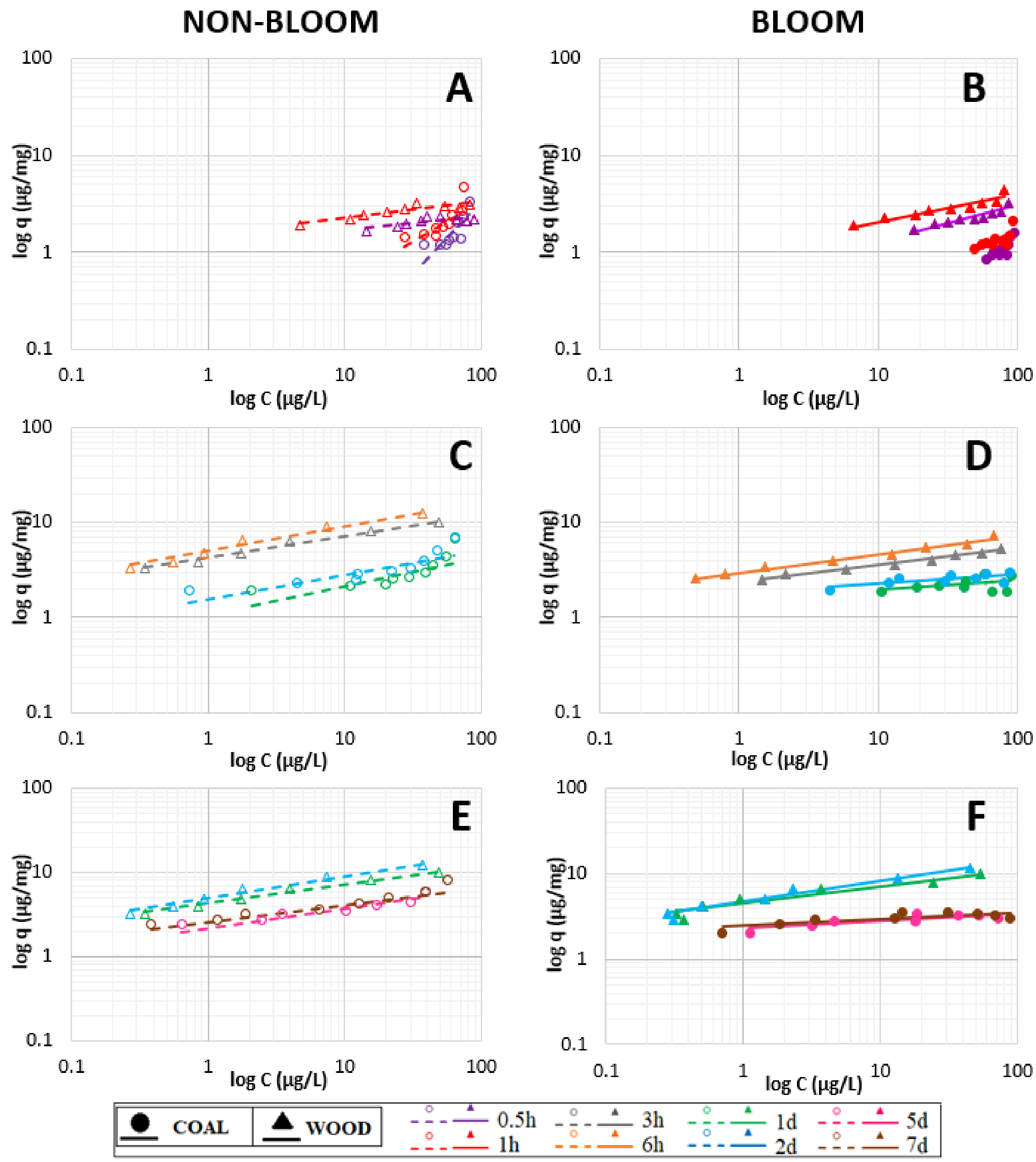

Figure S10. Comparison of adsorption capacities of coal- and wood-based PACs for MC-LR in non-bloom (A, C and E) and bloom water (B, D and F) for different adsorption times (top: 0.5 and 1 h; middle: 1 and 2d for coal- and 3 and 6h for wood-based PAC; bottom: 5 and 7d for coal- and 1 and 2d for wood-based) PAC) displayed as Freundlich plots

(Initial MC-LR concentration ~100 µg/L; carbon doses 5-50 mgPAC/L)

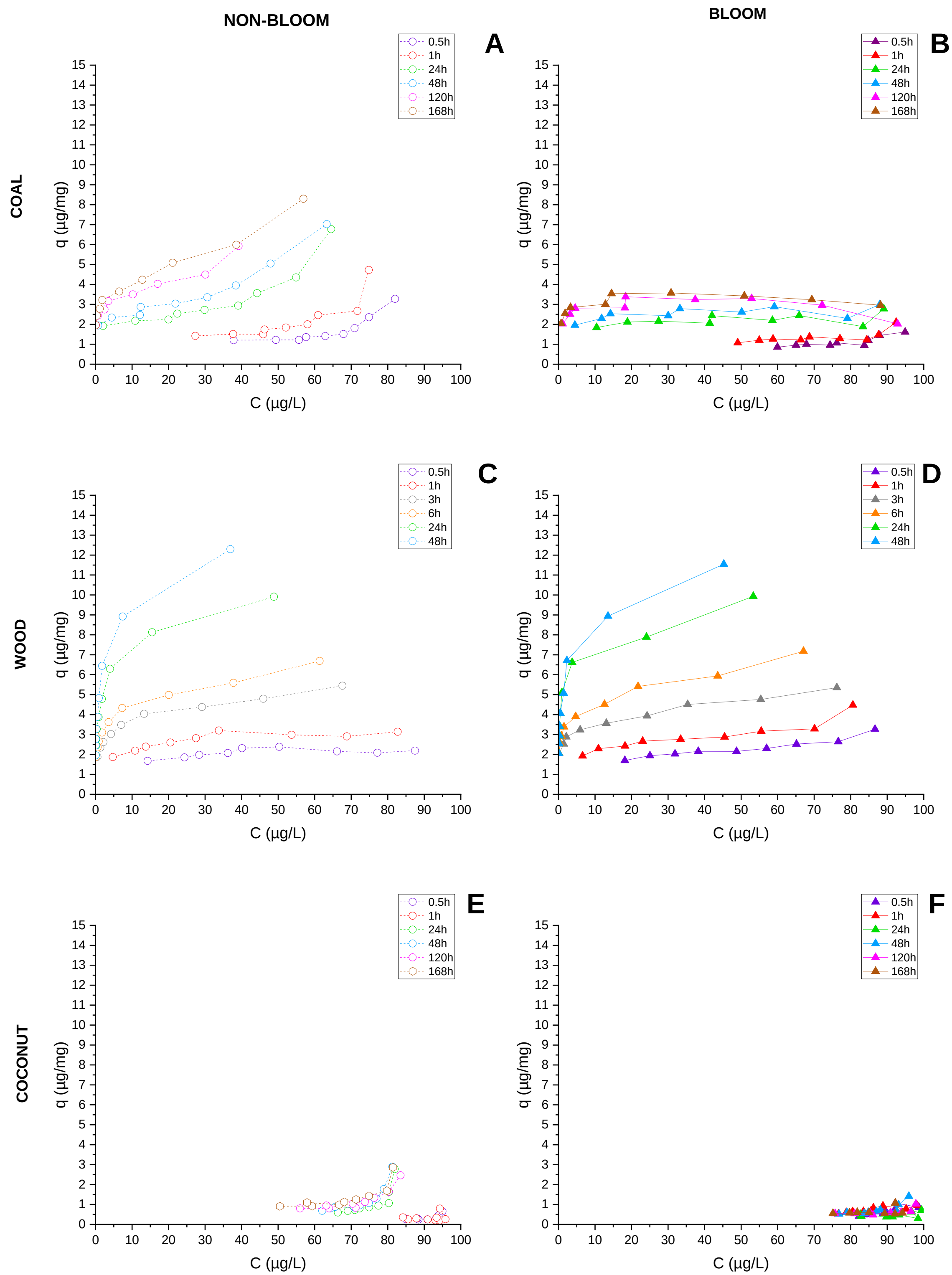

Figure S11. MC-LR adsorption capacities in the function of concentration in different contact times (0.5-168h) for coal- (A and B), wood- (B and C), and coconut-based (E and F) PACs in non-bloom (left side) and bloom (right side) water conditions. No fittings were applied.
(Initial MC-LR concentration ~100 µg/L; carbon doses 5-50 mgPAC/L)

SI-9. Non-linear regression for Freundlich equation

Table S8. Freundlich equation parameters for MC-LR adsorption with coal-, wood-, and coconut-based PAC in surface water samples under non-bloom and bloom conditions with 95% confidence interval in brackets. (Parameters were calculated using non-linear regression i.e. non-linear least square model via the Levenberg–Marquardt error minimization algorithm)

Non bloom conditions			Bloom conditions	
K_f (µg/mg) (µg/L)$^{-1/n}$	1/n	Contact time	K_f (µg/mg) (µg/L)$^{-1/n}$	1/n
		Coal-based carbon (COL-PL60-800)		
0.001 (-0.002, 0.003)	1.926 (0.932, 2.920)	t = 0.5h	0.003 (-0.006, 0.012)	1.352 (0.714, 1.990)
0.004 (-0.009, 0.017)	1.593 (0.779, 2.408)	t = 1h	0.059 (-0.083, 0.200)	0.737 (0.178, 1.295)
0.284 (-0.146, 0.713)	0.706 (0.307, 1.106)	t = 1d	1.543 (0.468, 2.618)	0.099 (-0.083, 0.280)
0.877 (0.195, 1.564)	0.454 (0.238, 0.671)	t = 2d	1.831 (1.348, 2.313)	0.095 (0.023, 0.168)
1.383 (0.493, 2.273)	0.362 (0.176, 0.547)	t = 3d	2.188 (1.712, 2.664)	0.063 (0.000, 0.126)
1.876 (1.125, 2.627)	0.296 (0.177, 0.415)	t = 4d	2.244 (1.857, 2.631)	0.075 (0.025, 0.025)
2.424 (1.987, 2.860)	0.205 (0.141, 0.268)	t = 5d	2.471 (1.785, 3.157)	0.043 (-0.043, 0.128)
2.554 (1.977, 3.132)	0.255 (0.184, 0.325)	t = 7d	2.491 (2.085, 2.898)	0.073 (0.023, 0.124)
		Wood-based carbon (BG-HHM)		
1.297 (0.821, 1.772)	0.126 (0.031, 0.222)	t = 0.5h	0.550 (0.294, 0.806)	0.372 (0.256, 0.489)
1.558 (1.228, 1.888)	0.164 (0.105, 0.224)	t = 1h	1.043 (0.603, 1.484)	0.292 (0.180, 0.405)
2.245 (2.125, 2.366)	0.206 (0.189, 0.223)	t = 3h	2.441 (2.252, 2.631)	0.169 (0.145, 0.192)
2.686 (2.543, 2.830)	0.215 (0.197, 0.232)	t = 6h	2.957 (2.741, 3.174)	0.198 (0.174, 0.219)
4.085 (3.795, 4.374)	0.238 (0.213, 0.263)	t = 1d	4.335 (3.861, 4.809)	0.209 (0.172, 0.245)
4.879 (4.508, 5.249)	0.266 (0.238, 0.293)	t = 2d	4.605 (4.208, 5.002)	0.248 (0.193;0.280)
		Coconut-based carbon (WPC)*		
6.75E-13 (-2.80E-11, 2.93E-11)	5.975 (-3.399, 15.348)	t = 0.5h	1.52E-08 (-1.44E-07, 1.75E-07)	3.915 (1.584, 6.246)
6.49E-05 (-3.97E-03;4.13E-03)	1.890 (-7.281, 11.060)	t = 1h	3.97E-17 (-5.03E-16, 5.82E-16)	8.465 (5.418, 11.512)
5.59E-17 (-1.21E-15, 1.32E-15)	8.657 (3.491, 13.824)	t = 1d	0.001 (-1.35E-02, 1.56E-02)	1.346 (-1.631, 4.324)
1.83E-13 (-2.12E-12, 2.49E-12)	6.869 (3.974, 9.763)	t = 2d	3.40E-10 (-3.36E-09, 4.04E-09)	4.808 (2.392, 7.224)
4.29E-13 -5.91E-12, 6.77E-12	6.714 (3.304, 10.125)	t = 3d	8.76E-05 (-7.49E-04, 9.24E-04)	1.960 (-0.155, 4.076)
1.46E-08 (-2.80E-07, 3.09E-07)	4.177 (-0.446, 8.799)	t = 4d	4.95E-07 (-5.38E-06, 6.37E-06)	3.123 (-0.015, 6.349)
8.17E-08 (-4.55E-07, 6.19E-07)	3.856 (2.342, 5.370)	t = 5d	2.64E-05 (-1.58E-04, 1.99E-04)	2.300 (0.366, 4.233)
2.340 (1.677, 3.002)	-0.154 (-0.230, -0.079)	t = 7d	0.004 (-4.19E-02, 4.92E-02)	1.156 (-1.616, 3.928)

*Results for coconut-based PAC - very poor fitting due to low adsorption for all tested carbon doses in both water samples

SI-10. JCRs - 95% Joint Confidence Regions

The mathematical form of Freundlich equation (Equation E2) is closely related to both coefficients (K_F and 1/n) (Worch, 2012). Valuable information on the estimates of correlated parameters can be provided with joint confidence regions (JCR). JCRs allow to distinguish model fits with greater accuracy than using single-parameter confidence intervals.

JCRs at 95% confidence level for the K_f and 1/n were calculated and fitted using the non-linear least squares regression model, which is a conceptually simple way of developing estimators with good properties of minimize the sum of squares for error SSE (Stanford & Vardeman, 1994). JCRs were calculated and plotted using Python code, and followed equations shown by Fairey and Wahman (2013).

References:

- Fairey, J. L., & Wahman, D. G. (2013). Bayesian and frequentist methods for estimating joint uncertainty of Freundlich adsorption isotherm fitting parameters. *Journal of Environmental Engineering*, *139*(2), 307-311.
- Stanford, J. L., & Vardeman, S. B. (1994). *Statistical methods for physical science* (Vol. 28). Academic Press.
- Worch, E. (2012). *Adsorption technology in water treatment*. de Gruyter.

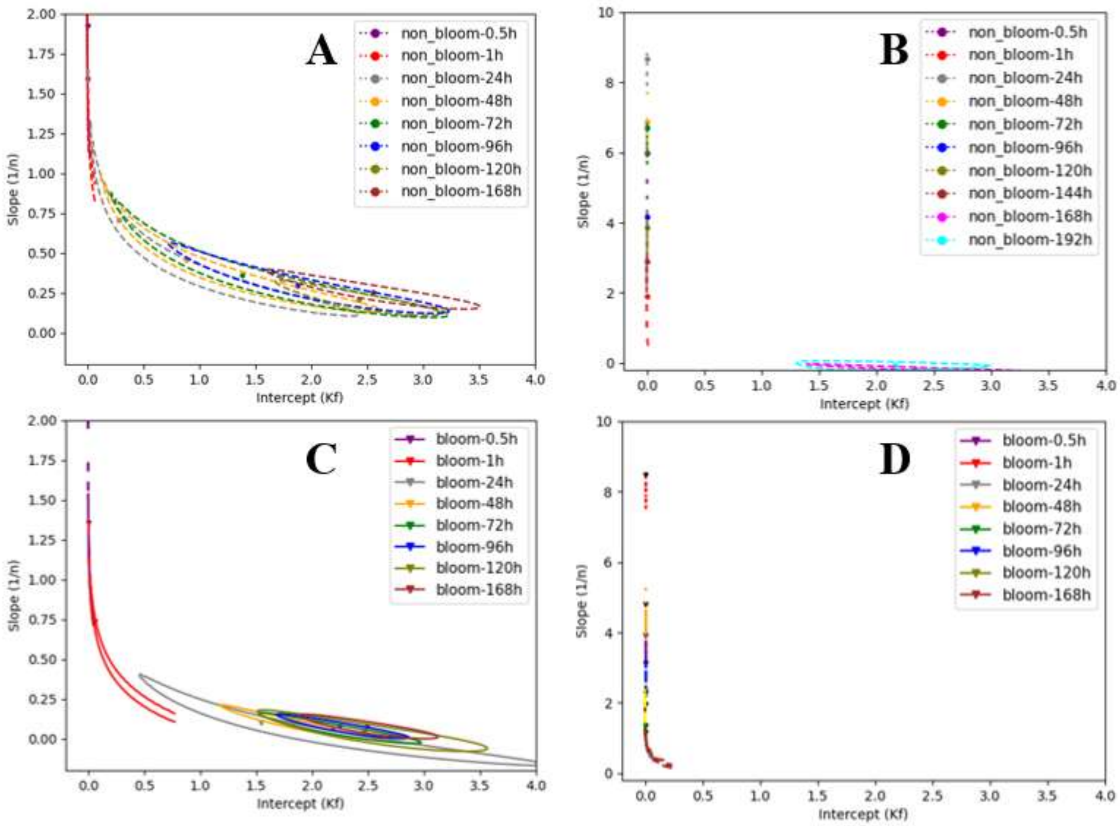

Figure S12. JCRs (ellipses on figures) and point estimates (points on figures) for the Freundlich parameters generated for the adsorption of MC-LR with coal- (A and C) and coconut-based PAC (B and D) in non-bloom water (top, i.e. A and B) and in bloom water (bottom, i.e. C and D) for contact times from 0.5h to 192h (8d)

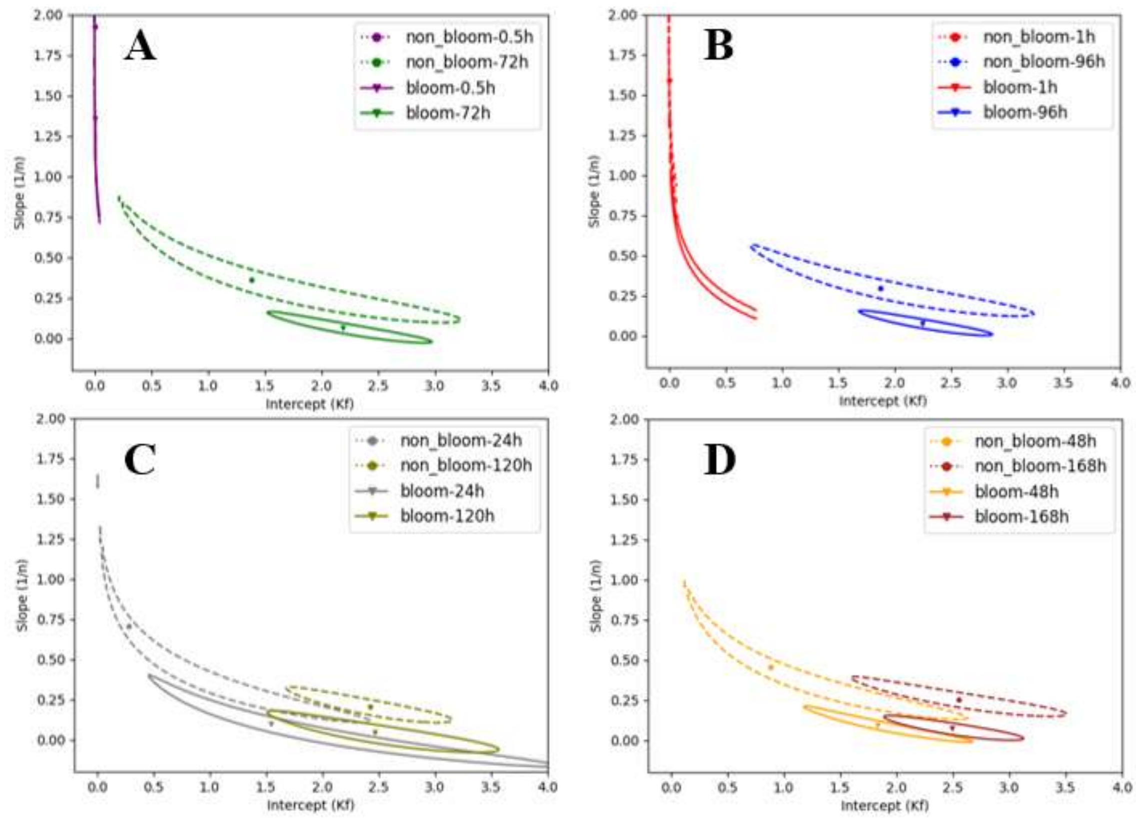

Figure S13 Comparison of JCRs (ellipses on figures) and point estimates (points on figures) for both non-bloom (dashed lines) and bloom (solid lines) water for coal-based PAC.

SI-11. Adsorption capacity of NOM fractions

Table S9. Summary of the average adsorption capacities and removal efficiency of MC-LR and different NOM fractions with 50 mg/L of coal-, wood- and coconut-based PACs in non-bloom and bloom water samples

			BP	HS	BB	LMW-A	LMW-N	MC-LR
Adsorption capacity q (mg/g)	Non-bloom	coal	1.7	15.6	6.0	1.8	5.9	2.0
		wood	2.6	16.1	5.9	1.7	5.6	2.0
		coconut	0.2	2.1	2.3	-	-	1.9
	Bloom	coal	2.6	19.7	8.6	3.0	10.0	2.0
		wood	5.1	25.6	9.5	2.8	9.4	2.1
		coconut	2.4	5.2	5.3	2.0	8.3	0.5
% Removal	Non-bloom	coal	11.0	23.4	35.5	50.2	29.9	99.7
		wood	16.9	24.2	34.9	47.7	28.4	99.9
		coconut	1.5	3.2	13.4	-	-	37.2
	Bloom	coal	7.1	24.3	39.9	53.5	64.1	96.6
		wood	13.7	31.3	44.1	49.0	52.0	99.9
		coconut	6.5	6.4	24.6	36.0	53.6	24.7