

Supplementary Materials: Cyanotoxins and Cyanobacteria Cell Accumulations in Drinking Water Treatment Plants with a Low Risk of Bloom Formation at the Source

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Table S1. Cell speciation in all samples with concentrations in cells/mL.

			Microcystis					Aphan.	Coelos.	Woro.	Anabaena						
			aeru.	sp.	wesenb.	viridis	novaceki	flos-aquae	flos-aquae	kuetz.	naegel.	sp.	circinalis	lemm.	spiroides	planctonica	
Plant A	Raw water	16-10-11	107	481					3	162		58	10		1		
Plant A		17-08-21	509	293	20		52			22							
Plant A		17-10-02		69672					2	0.2			15				
Plant A		17-10-26	68	28		3	75								7		
Plant A		17-11-15		297													
Plant A	Clarifier surface	16-10-11		21					9	11							
Plant A		17-08-21		2583													
Plant A		17-10-02		5712													
Plant A		17-10-26		47													
Plant A		17-11-15		29													
Plant A	Clarifier sludge	16-10-11		420	1029	200	6129	2245	197			102	239		24		
Plant A		17-08-21	539	5934													
Plant A		17-10-02	105	6109	506	20		493									
Plant A		17-10-26	25	22514			554										
Plant A		17-11-15				257											
Plant A	Filter surface	16-10-11							1	21		11	1	1			
Plant A		17-08-21	2246	2158	851				112				81		12		
Plant A		17-10-02	216	5428	45											6	
Plant A		17-10-26	75	118													
Plant A		17-11-15		52			119										
Plant A	Filter backwash	16-10-11		234					68	537			73				
Plant A		17-08-21		238666	450				31				56				
Plant A		17-10-02		113488													
Plant A		17-10-26	350	6501													
Plant A		17-11-15	10139	438													
Plant A	Finished water	17-08-21															
Plant A		17-10-02		341					0.3								
Plant A		17-10-26		24													
Plant A		17-11-15		4													
Plant B		Raw water	16-09-27					7			13						
Plant B	17-08-25																
Plant B	17-09-13																
Plant B	17-10-24																
Plant B	16-09-27										54		11		1	1	
Plant B	Clarifier surface	17-08-25											0.25				
Plant B		17-09-13											0.2	10			
Plant B		17-10-24	96	175						10							
Plant B		16-09-27															
Plant B		17-08-25															
Plant B	Clarifier sludge	17-09-13												22			
Plant B		17-10-24		16				820		10						58	
Plant B		16-09-27								29			2	1			
Plant B		17-08-25					43										
Plant B		17-09-13													5		
Plant B	17-10-24													3			

Plant B	Filter backwash	16-09-27						5	8				
Plant B		17-08-25	2										
Plant B		17-09-13						18	6				
Plant B		17-10-24	3					4					
Plant B	Finished water	17-08-25											
Plant B		17-09-13											
Plant B		17-10-24											
Plant C	Raw water	17-09-07	424	140	143	21							
Plant C		17-10-04	4	8			90	2	4				
Plant C		17-10-25	4	9			13	1					
Plant C		17-11-16	56				988	11	223				
Plant C	Clarifier surface	17-09-07	4	2	38								
Plant C		17-10-04	2							3			
Plant C		17-10-25	5	20	10						1		
Plant C		17-11-16	9										
Plant C	Clarifier sludge	17-09-07	324	136797	260								
Plant C		17-10-04	87										
Plant C		17-10-25	921	157									
Plant C		17-11-16				138							
Plant C	Filter surface	17-09-07	29										
Plant C		17-10-04	23								7		
Plant C		17-10-25	12										
Plant C		17-11-16											
Plant C	Filter backwash	17-09-07											
Plant C		17-10-04	28			462							
Plant C		17-10-25	83								2		
Plant C		17-11-16											
Plant C	Finished water	17-09-07											
Plant C		17-10-04											
Plant C		17-10-25											
Plant C		17-11-16											
Plant D	Raw water	16-10-12						256					
Plant D		17-08-28	2	92	7								
Plant D		17-09-08											
Plant D		17-10-06											
Plant D		17-11-23											
Plant D	Clarifier surface	16-10-12	0.1										
Plant D		17-08-28	12								4		
Plant D		17-09-08											
Plant D		17-10-06											
Plant D		17-11-23											
Plant D	Clarifier sludge	16-10-12	1300			657							
Plant D		17-08-28											
Plant D		17-09-08											
Plant D		17-10-06						22	23				
Plant D		17-11-23	56										
Plant D	Filter surface	16-10-12											
Plant D		17-08-28	49										
Plant D		17-09-08											
Plant D		17-10-06											
Plant D		17-11-23											
Plant D	Filter backwash	16-10-12	1065	35	200			52					
Plant D		17-08-28	209			34							
Plant D		17-09-08	24										
Plant D		17-10-06											
Plant D		17-11-23											
Plant D	Finished water	17-08-28											
Plant D		17-09-08											

Plant D	17-10-06
Plant D	17-11-23

Table S2. General water qualities.

	Sampling visit																	
	Plant A					Plant B					Plant C				Plant D			
Raw Water	1	2	3	4	5	1	2	3	4	1	2	3	4	1	2	3	4	5
Temperature (°C)	19	24	21	14	12	-	6	13	8	22	20	17	11	19	24	21	22	12
Turbidity (NTU)	5.2	8.6	-	35	21	2.3	0.2	0.2	0.2	5	3.7	3.3	8.2	1.75	3.2	0.4	-	5.1
pH	8.2	8.6	-	-	-	8.2	7.4	-	7.7	8	7.8	8	0.9	8	8	7.5	7.7	7.7
Free Cl ₂ (mg/L)	-	0	-	0	0	-	0.02	0.2	0	0	0	0	0	0.04	0.04	0.01	0	0
Total Cl ₂ (mg/L)	0.01	0	-	0	0	-	0.01	0.34	0	0	0	0	0	0.07	0.03	0.01	0	0
DOC (mg/L)	2.1	3.3	3.3	1.8	1.9	2.6	2.3	0.2	2.1	16	6.2	5.3	5.9	2.6	2.9	6.8	2.7	2.3
Finished Water	1	2	3	4	5	1	2	3	4	1	2	3	4	1	2	3	4	5
Temperature (°C)	-	24	20	-	-	-	9	15	11	21	20	17	12	-	23	22	20	10
Turbidity (NTU)	-	0	-	0.05	0.06	-	0.1	0.1	0.05	0.2	0.3	0.3	0.3	-	0.1	0.2	-	0.1
pH	-	7.7	-	7.6	7.5	-	7.5	-	-	7.4	7.3	7.2	7.2	-	7.2	7.4	7.3	7.3
Free Cl ₂ (mg/L)	-	0.12	-	0.05	0.08	-	0.05	0.05	0.07	2.3	2.5	2.4	2.7	-	1.2	1.2	1.4	1.3
Total Cl ₂ (mg/L)	-	1.3	-	2.1	2.0	-	2.1	1.9	2.0	2.7	2.8	2.7	3.1	-	1.4	2.1	1.5	1.5
DOC (mg/L)	-	2.1	2.1	1.1	1.3	-	2.2	6.7	1.8	5.7	2.6	2.2	2.8	-	2.1	5.5	2.1	1.8

Table S3. Method detection limits for all ELISA tests performed in µg/L.

		Sampling visit				
		1	2	3	4	5
Cyanotoxin	Plant A	0.37	0.75	0.39	1.07	0.33
Microcystins	Plant B	0.37	0.75	0.43	1.07	
	Plant C	0.43	0.39	1.07	0.33	
	Plant D	0.37	0.75	0.43	0.39	0.33
Anatoxin-a	Plant A	0.27	0.60	0.21	0.24	0.16
	Plant B	0.27	0.60	0.18	0.24	
	Plant C	0.18	0.21	0.24	0.16	
	Plant D	0.27	0.60	0.18	0.21	0.16
Saxitoxin	Plant A	0.12	0.03	0.02	0.02	0.04
	Plant B	0.12	0.03	0.05	0.02	
	Plant C	0.05	0.02	0.02	0.04	
	Plant D	0.12	0.03	0.05	0.02	0.04
Cylindrospermopsin	Plant A	0.4	0.35	0.13	0.12	0.87
	Plant B	0.4	0.35	0.43	0.12	
	Plant C	0.43	0.13	0.12	0.87	
	Plant D	0.4	0.35	0.43	0.13	0.87
BMAA	Plant A	17.3	-	3.85	-	-
	Plant B	17.3	-	5.56	-	
	Plant C					
	Plant D	17.3	-	5.56	3.85	-

Table S4. Method detection limits for the ELISA test kits provided by Abraxis.

	Manufacturer listed MDL (µg/L)
Cyanotoxin	
Microcystins	0.1
Anatoxin-a	0.1
Saxitoxin	0.015
Cylindrospermopsin	0.04
BMAA	4

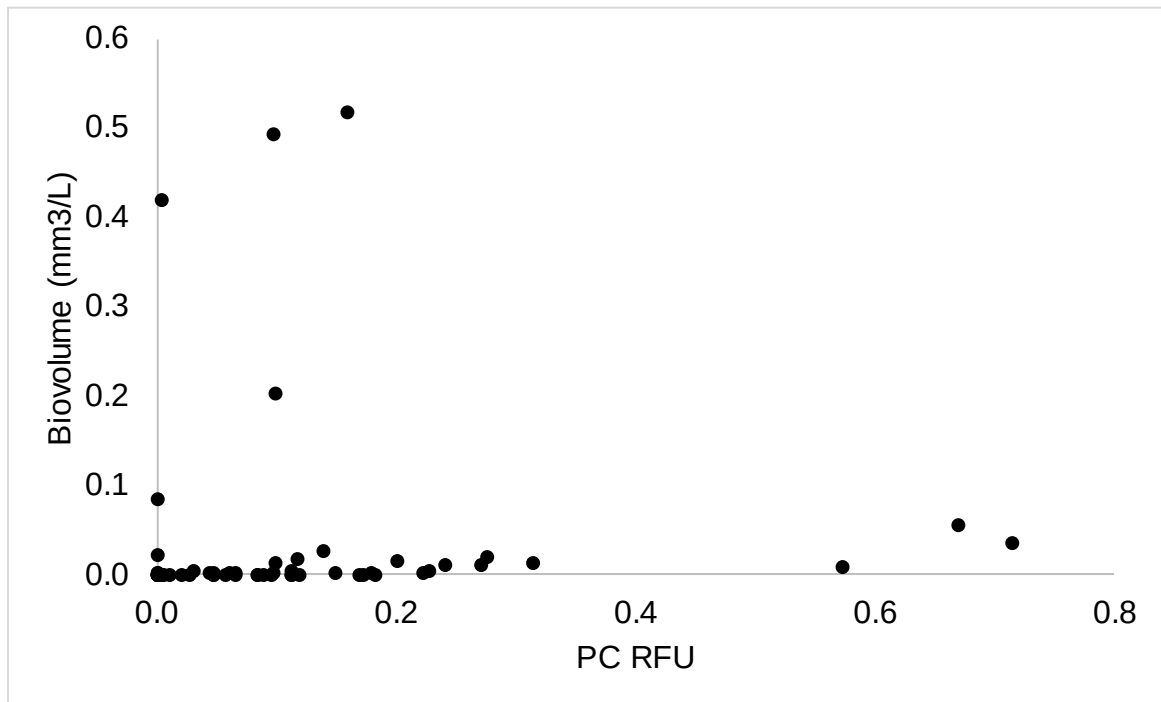


Figure S1. No correlation was found between cyanobacteria biovolume and phycocyanin fluorescence.