

Sorption Characteristics and Removal Efficiency of Organic Micropollutants in Drinking Water Using Granular Activated Carbon (GAC) in Pilot-Scale and Full-Scale Tests

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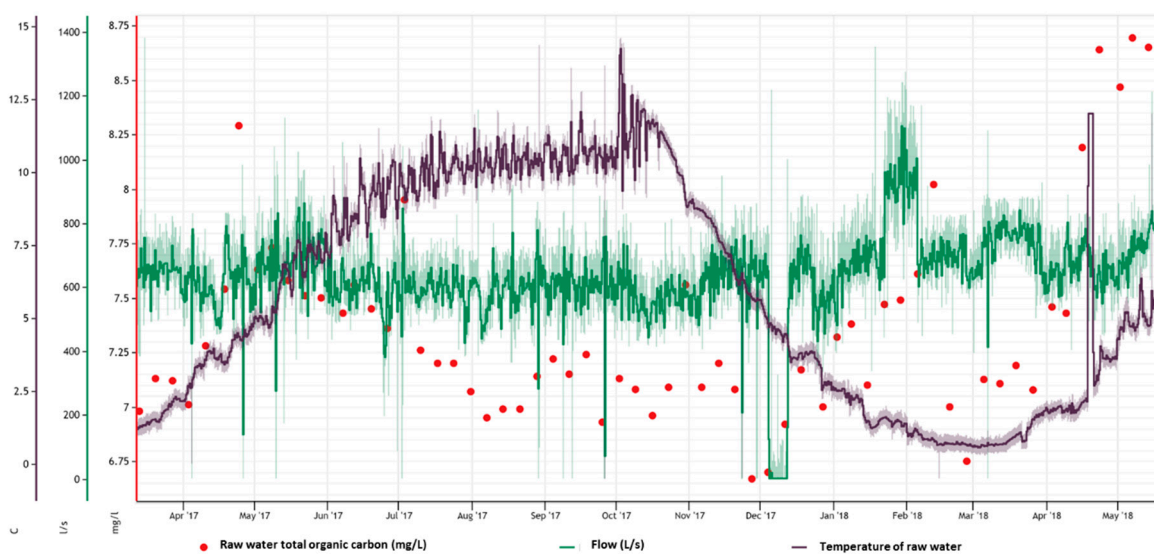


Figure S1. Total organic carbon content, flow and temperature of incoming raw water during the whole study period (April 2017 to March 2018).

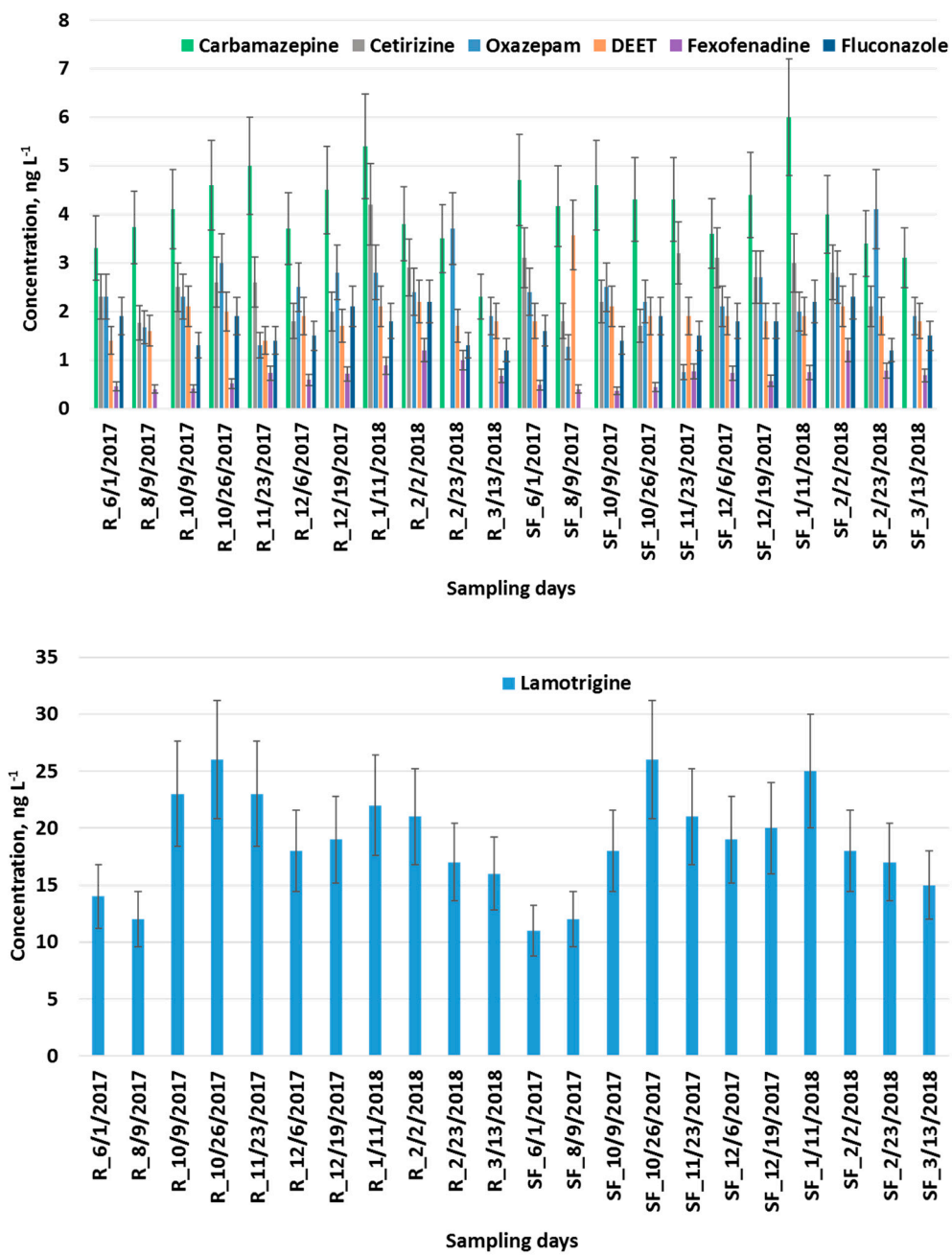


Figure S2. Occurrence of OMPs in the raw water (R) and sand filter water (SF) (ng L^{-1}).

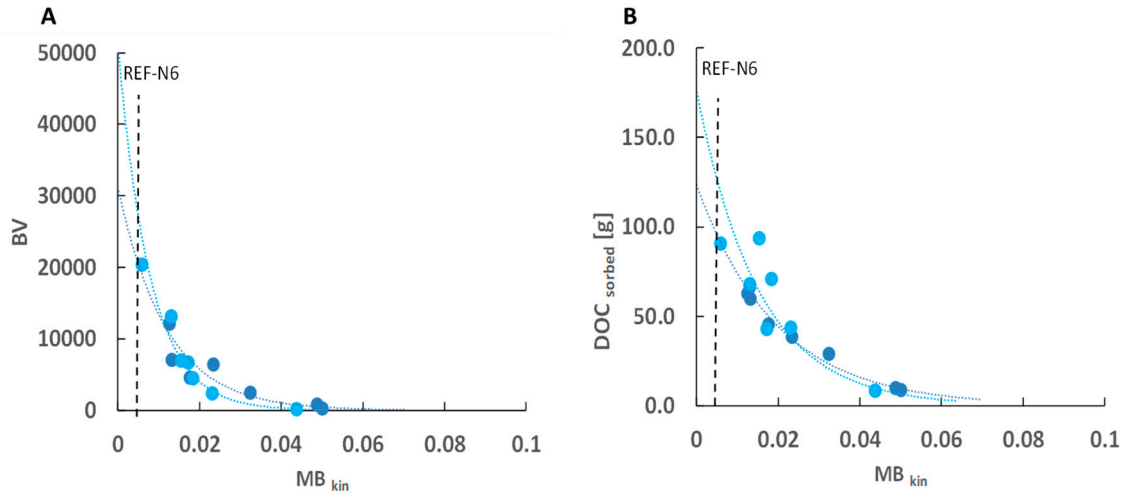


Figure S3. Change in methylene blue (MB) kinetic sorption factor of Filtrasorb (light blue), Norit (dark blue) against bed volume (BV, A) or total amount of dissolved organic carbon (DOC) retained ([g], B) for all columns. The dashed line represents full-scale GAC filter - Ref-N6, filled with Norit 830W and with an empty bed contact time (EBCT) of 6 min.

Table S1. Occurrence of OMPs in raw water (RAW), rapid sand filtrate effluent water (SF) and the effluent from a full-scale GAC treatment (Ref-N6, column filled with Norit 830W and with an empty bed contact time (EBCT) of 6 min) and from pilot-scale columns (C1-N18, Norit 830W and EBCT of 18 min; C3-F18, Filtrasorb 400 and EBCT of 18 min; C4-F6, Filtrasorb 400 and EBCT of 6 min) (ng L⁻¹).

Sampling site	Sampling date	Carbamazepine	Cetirizine	Oxazepam	DEET	Fexofenadine	Lamotrigine	Fluconazole
RAW	6/1/2017	3.3	2.3	2.3	1.4	0.46	14	1.9
	8/9/2017	3.73	1.77	1.67	1.6	0.4	12	NA
	10/9/2017	4.1	2.5	2.3	2.1	0.41	23	1.3
	10/26/2017	4.6	2.6	3	2	0.51	26	1.9
	11/23/2017	5	2.6	1.3	1.4	0.73	23	1.4
	12/6/2017	3.7	1.8	2.5	1.9	0.59	18	1.5
	12/19/2017	4.5	2	2.8	1.7	0.71	19	2.1
	1/11/2018	5.4	4.2	2.8	2.1	0.88	22	1.8
	2/2/2018	3.8	2.9	2.4	2.2	1.2	21	2.2
	2/23/2018	3.5	<1.5	3.7	1.7	1	17	1.3
	3/13/2018	2.3	<0.81	1.9	1.8	0.67	16	1.2
SF	6/1/2017	4.7	3.1	2.4	1.8	0.48	11	1.6
	8/9/2017	4.17	1.80	1.27	3.57	0.40	12	NA
	10/9/2017	4.6	2.2	2.5	2.1	0.36	18	1.4
	10/26/2017	4.3	1.7	2.2	1.9	0.44	26	1.9
	11/23/2017	4.3	3.2	0.75	1.9	0.77	21	1.5
	12/6/2017	3.6	3.1	2.1	1.9	0.73	19	1.8
	12/19/2017	4.4	2.7	2.7	1.8	0.57	20	1.8
	1/11/2018	6	3	2	1.9	0.74	25	2.2
	2/2/2018	4	2.8	2.7	2.1	1.2	18	2.3
	2/23/2018	3.4	2.1	4.1	1.9	0.78	17	1.2
	3/13/2018	3.1	<0.75	1.9	1.8	0.68	15	1.5
Ref-N6	6/1/2017	NA	NA	NA	NA	NA	NA	NA
	8/9/2017	10.07	4.00	2.33	6.87	0.4	24	NA
	10/9/2017	4.1	2.2	1.8	2.1	0.29	12	1.2
	10/26/2017	4.7	1.9	2.5	1.7	0.49	16	1.5
	11/23/2017	4.1	2.8	1.2	1.9	0.61	17	1.7
	12/6/2017	3.9	2.5	3.1	2.2	0.72	21	1.6
	12/19/2017	4.9	2.8	2.8	2.2	0.78	21	1.3
	1/11/2018	5.4	2.6	2.7	1.7	0.69	14	2.9
	2/2/2018	3.8	1.8	2.7	1.8	1.1	14	2.5
	2/23/2018	3.6	1.9	2.8	1.9	0.87	13	1.3

	3/13/2018	3.5	<1.1	2.4	2	0.72	12	1.1
	6/1/2017	<0.15	<0.71	0.46	0.48	<0.28	<0.27	<0.15
	8/9/2017	<0.17	<0.26	<0.47	0.73	<0.29	<0.28	NA
	10/9/2017	<0.81	<0.41	0.56	0.73	<0.12	<0.21	0.17
	10/26/2017	<0.31	<0.43	0.85	0.47	0.13	<0.17	<0.09
	11/23/2017	<0.19	<0.75	0.5	0.45	0.26	<0.3	<0.17
C1-N18	12/6/2017	<0.14	<0.68	0.7	0.39	0.31	<0.26	0.43
	12/19/2017	<0.17	1.6	0.82	0.41	0.29	0.38	0.18
	1/11/2018	<0.3	0.91	0.78	0.44	<0.53	<0.53	<0.36
	2/2/2018	<0.17	0.92	0.58	0.53	0.66	<0.26	0.68
	2/23/2018	<0.25	<1.2	1	0.62	0.54	<0.38	0.72
	3/13/2018	<0.22	<1	0.46	0.95	<0.47	<0.37	0.98
	6/1/2017	<0.15	<0.75	0.56	0.35	<0.26	<0.28	<0.16
	8/9/2017	<0.18	<0.26	<0.47	0.77	<0.27	<0.29	NA
	10/9/2017	<0.75	<0.4	0.42	0.77	<0.12	<0.21	<0.12
	10/26/2017	<0.3	<0.31	0.73	0.44	<0.11	0.26	<0.09
	11/23/2017	<0.17	0.83	0.95	0.28	<0.29	<0.3	<0.2
C3-F18	12/6/2017	<0.18	1.2	1.3	0.49	<0.29	<0.36	<0.17
	12/19/2017	<0.16	1	0.82	0.45	<0.28	<0.33	0.24
	1/11/2018	<0.26	1.6	0.63	0.44	<0.48	<0.5	0.46
	2/2/2018	<0.18	<0.89	0.43	0.56	<0.37	0.42	0.59
	2/23/2018	<0.27	<1.3	0.85	0.6	<0.49	<0.35	0.54
	3/13/2018	<0.2	1.1	0.76	0.85	<0.43	0.54	0.46
	6/1/2017	<0.16	1.4	0.75	0.52	<0.28	<0.29	<0.19
	8/9/2017	<0.3	<0.26	<0.47	0.8	<0.29	<0.30	NA
	10/9/2017	<0.79	1	1.2	0.91	0.13	<0.2	0.58
	10/26/2017	<0.32	1.1	1.3	0.72	0.18	0.87	0.54
	11/23/2017	1.1	1.8	0.51	0.98	0.39	1.4	0.9
C4-F6	12/6/2017	1.2	1.8	1.3	1.3	0.48	2.9	0.94
	12/19/2017	1.5	2.3	1.8	1.3	0.58	2.7	1.2
	1/11/2018	2.2	<1.3	0.95	0.95	<0.48	2.4	1.8
	2/2/2018	1.9	0.96	1.4	1.1	0.64	3.5	1.6
	2/23/2018	1.7	1.4	1.6	1	0.5	3.1	0.85
	3/13/2018	1.5	1.2	1.6	1.4	0.63	2.5	0.73

NA— not analyzed; RAW— mixture of 20 and 25 meters; SF— sand filter water.