Supplementary Information for

Effects of Ammonium and COD on Fe and Mn Release from RBF Sediment Based on Column Experiment

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Table S1. The average value of pH, DO concentration and Eh over time.

Time	Colum A			Colum B			Colum C		
(h)	pH	DO (mg/L)	Eh (mv)	pH	DO (mg/L)	Eh (mv)	pH	DO (mg/L)	Eh (mv)
0	6.11	12.60	210.78	7.06	11.97	209.00	5.52	13.44	207.20
4	7.19	9.67	193.52	7.06	11.67	193.40	5.75	11.94	220.86
6	7.05	13.56	184.84	7.01	11.67	185.28	6.06	12.32	193.40
10	7.57	8.48	218.80	6.97	11.19	217.24	6.24	12.56	185.28
12	7.52	8.67	216.78	6.68	10.59	216.78	6.17	12.79	217.24
14	7.65	8.32	212.60	6.74	9.86	212.60	6.23	9.06	216.78
22	7.44	10.39	216.00	6.80	11.30	230.42	6.29	7.61	224.52
30	6.82	9.55	269.46	6.75	11.39	234.24	6.23	7.71	214.52
37	6.89	8.15	241.96	6.70	12.58	228.80	6.30	7.99	227.40
46	6.94	7.68	234.98	6.62	10.28	213.20	6.16	8.58	231.20
53	6.95	7.79	234.00	6.40	16.65	199.34	6.14	8.75	221.54
60	6.47	8.51	240.74	7.00	15.82	178.80	6.35	17.97	202.36
84	6.24	8.53	209.92	6.93	10.30	176.26	6.16	11.40	187.72
95	6.26	12.48	214.74	6.41	9.25	227.20	6.09	10.45	185.72
107	6.48	11.58	206.12	6.54	16.69	240.48	6.12	13.56	209.64
118	6.64	10.42	202.84	6.54	15.83	226.88	6.03	14.71	180.48
130	6.63	16.58	245.34	6.47	13.48	229.40	6.29	13.98	198.22
142	6.75	15.92	225.64	6.18	12.28	242.04	6.34	13.92	195.68
154	6.87	16.04	210.54	6.55	11.52	264.60	6.11	13.93	192.68
166	6.83	15.77	203.84	6.61	11.16	286.74	6.05	16.95	178.20
190	6.69	16.32	236.06	6.57	11.50	219.46	5.99	16.58	174.58
214	6.74	15.18	259.80	6.56	11.89	216.80	6.17	10.18	220.96
238	6.73	13.28	209.08	6.23	12.24	252.78	6.02	11.31	222.58
262	6.75	14.23	224.00	6.07	10.89	260.76	6.06	10.49	239.56
286	6.95	15.72	241.84	6.21	10.77	248.66	6.07	10.79	237.48
310	6.54	11.07	258.22	5.98	13.55	250.74	6.42	12.08	243.28
334	7.13	11.02	248.72	6.12	15.40	259.82	6.26	10.37	248.22
358	6.62	10.06	246.32	6.30	10.89	237.00	6.02	10.40	239.08
382	6.85	10.36	244.58	6.26	11.82	245.42	6.19	13.17	247.76
406	6.84	10.79	238.90	6.29	9.77	239.02	6.29	14.32	226.04
454	6.56	10.30	252.02	6.37	10.70	223.72	6.25	10.31	242.62
516	6.96	12.70	239.84	6.39	11.64	216.80	6.08	11.26	211.04
564	6.56	10.55	240.28	6.24	10.65	250.68	6.21	13.22	198.82
612	7.09	7.09	205.80	6.34	11.76	264.14	6.27	13.83	202.60
646	7.11	7.11	209.48	6.45	10.12	271.28	6.29	12.24	218.06
660	7.02	8.28	209.40	6.42	9.98	258.20	6.24	12.10	258.20
694	7.12	9.48	226.60	6.48	10.16	244.00	6.14	12.12	244.00
742	7.09	10.92	231.40	6.47	10.40	231.60	6.25	12.04	231.60

Table S2 The average value of Fe and Mn concentration over time.

Time	Colum A		Colum B		Colum C	
(h)	Fe (mg/L)	Mn (μg/L)	Fe (mg/L)	Mn (μg/L)	Fe (mg/L)	Mn (μg/L)
0	0.027	1.488	0.034	6.906	0.028	5.258
4	0.025	1.612	0.051	5.370	0.025	3.692
6	0.033	1.880	0.060	5.902	0.024	5.520
10	0.038	2.020	0.052	6.000	0.031	4.880
12	0.045	2.600	0.065	5.024	0.031	6.504
14	0.048	3.120	0.076	4.442	0.029	9.000
22	0.049	3.440	0.083	4.804	0.033	8.672
30	0.057	3.280	0.071	6.820	0.045	9.600
37	0.061	3.360	0.083	3.535	0.054	10.530
46	0.063	3.460	0.080	3.712	0.074	10.510
53	0.057	3.700	0.108	4.164	0.071	10.800
60	0.059	3.920	0.104	3.880	0.092	9.477
84	0.058	3.820	0.113	4.060	0.135	11.000
95	0.061	4.240	0.123	3.738	0.140	9.146
107	0.062	4.160	0.132	3.502	0.140	11.400
118	0.063	4.260	0.144	4.072	0.166	12.200
130	0.062	4.420	0.172	3.936	0.178	16.200
142	0.062	4.480	0.142	4.824	0.220	18.400
154	0.059	4.260	0.150	6.432	0.213	22.400
166	0.058	4.180	0.166	7.102	0.200	22.600
190	0.054	3.860	0.200	8.782	0.254	22.800
214	0.050	3.780	0.196	10.174	0.212	19.800
238	0.052	3.440	0.205	15.078	0.160	20.600
262	0.048	2.832	0.201	12.636	0.199	24.200
286	0.050	2.720	0.211	11.158	0.140	21.200
310	0.046	2.540	0.165	14.464	0.134	16.004
334	0.040	2.500	0.139	14.988	0.079	15.524
358	0.038	2.500	0.141	20.454	0.098	17.516
382	0.031	2.320	0.140	29.546	0.076	16.226
406	0.023	2.184	0.134	29.960	0.114	15.196
454	0.024	2.154	0.106	46.620	0.090	20.680
516	0.023	2.100	0.128	26.600	0.087	18.288
564	0.023	2.510	0.124	28.400	0.071	16.772
612	0.021	2.155	0.120	31.600	0.071	16.600
646	0.021	2.198	0.110	31.800	0.068	14.200
660	0.021	2.214	0.120	32.200	0.083	16.600
694	0.027	1.488	0.034	6.906	0.028	5.258
742	0.025	1.612	0.051	5.370	0.025	3.692

Table S3. The proportion of microbial community abundance in sediment samples of different soil columns.

	Phylum						Genus				
Colum A	A1	A2	A3	A4	A5		A1	A2	A3	A4	A5
Actinobacteriota	40.56	36.77	23.10	28.65	45.64	Delftia	31.83	51.95	49.47	40.96	24.66
Proteobacteria	11.42	23.48	45.55	32.86	44.07	Rhodococcus	10.10	2.80	0.20	1.27	7.04
Acidobacteriota	15.20	9.17	3.26	6.96	1.43	MB-A2-108	11.21	4.97	0.23	2.90	13.79
Chloroflexi	10.79	7.18	5.55	14.19	2.73	Gaiellales	3.37	18.00	4.54	14.95	2.30
Firmicutes	5.32	4.18	11.36	1.12	1.99	Ochrobactrum	11.64	4.82	1.15	3.84	22.47
Bacteroidota	0.86	4.22	1.56	3.54	3.14	Subgroup_7	5.49	5.06	0.45	0.67	5.76
Gemmatimonadota	3.50	2.44	3.32	2.74	0.00	Vicinamibacterales	0.08	0.18	0.14	0.11	0.00
Methylomirabilota	4.84	2.41	0.15	0.02	0.00	Pseudarthrobacter	11.78	3.13	0.71	1.92	10.54
Myxococcota	1.29	1.69	2.45	2.55	0.00	KD4-96	14.49	7.82	0.66	0.52	13.43
Nitrospirota	1.56	1.20	0.28	0.33	0.00	Gaiella	0.00	0.75	0.12	0.06	0.01
others	4.67	7.26	3.43	7.04	1.00	other	0.00	0.53	42.31	32.79	0.00
Colum B	B1	B2	B3	B4	B5		B1	B2	B3	B4	B5
Proteobacteria	34.77	30.31	18.26	19.56	21.49	Pseudomonas	28.11	29.37	31.79	27.83	25.70
Actinobacteria	12.50	16.06	4.71	13.23	27.45	Acinetobacter	28.31	24.07	4.85	7.76	1.67
Acidobacteria	16.52	17.04	11.84	29.71	1.49	Sphingobium	21.77	14.61	14.89	17.93	15.56
Chloroflexi	20.25	15.49	22.48	15.60	3.25	Ochrobactrum	2.87	4.53	8.65	7.46	9.26
Firmicutes	1.66	2.08	15.27	2.63	34.82	Streptomyces	0.13	3.20	5.27	9.38	3.28
Gemmatimonadetes	0.50	2.80	2.18	0.60	7.62	Sphingomonas	7.55	4.19	4.87	4.15	1.81
Verrucomicrobia	8.34	3.62	0.33	5.10	0.00	Denitratisoma	2.28	2.59	5.82	4.54	6.02
Nitrospirae	0.71	4.22	0.28	4.98	0.00	Nitrosomomas	6.67	9.16	3.70	0.85	0.54
Bacteroidetes	1.09	1.62	0.49	1.70	0.00	Vicinamibacterales	1.89	3.49	4.53	4.91	16.87

AD3	0.38	1.28	0.44	1.25	0.00	Pseudarthrobacter	0.14	1.34	5.42	3.13	3.39
others	3.26	5.47	23.71	5.64	3.88	other	0.29	3.45	10.20	12.05	15.89
Colum C	C1	C2	C3	C4	C5		C1	C2	C3	C4	C5
Proteobacteria	54.47	16.70	26.70	32.83	34.74	Arthrobacter	29.76	32.90	33.15	28.78	25.31
Actinobacteriota	15.22	42.09	34.55	34.08	31.14	Paraburkholderia	28.72	11.18	20.14	28.67	23.32
Bacteroidota	5.88	7.07	3.86	4.08	4.63	Methylophilaceae	14.32	5.69	4.99	2.26	2.10
Acidobacteriota	2.88	5.61	6.39	5.86	5.84	Bradyrhizobium	0.34	9.39	6.09	16.26	16.35
Myxococcota	9.14	4.40	2.66	3.60	4.48	Massilia	3.05	9.75	7.48	9.67	12.21
Verrucomicrobiota	0.90	2.28	3.03	3.12	2.69	Variovorax	3.35	13.40	13.89	2.26	3.61
Patescibacteria	1.32	2.42	3.18	1.84	2.19	Micropepsaceae	10.20	2.75	2.00	0.18	0.36
Bacteria	1.76	2.37	1.33	3.66	3.61	Desulfobacterota	1.87	5.69	4.37	3.78	6.73
Gemmatimonadota	1.98	4.12	1.64	1.46	1.26	Gallionella	5.58	3.46	2.39	0.46	1.05
Chloroflexi	0.39	2.19	1.79	1.99	2.73	Pseudolabrys	1.25	1.97	0.94	1.86	1.38
others	6.06	10.76	14.86	7.49	6.70	other	1.55	3.83	4.57	5.82	7.59