

Influences of coal ash leachates and emergent macrophytes on water quality in wetland microcosms

Water Air and Soil Pollution

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Online Resource 1. Mean Elemental Concentrations for Initial Surface Water Screening

Table 1. Initial screening of mean surface water elemental concentrations by treatment and plant species for samples collected on 9/12/15, after the final dosing occurred. Concentrations in $\mu\text{g/L}$ and percent relative standard deviation (RSD) are reported. After a qualitative assessment, boron (B), manganese (Mn) and molybdenum (Mo) were chosen for further analysis due to notable differences in elemental concentrations between treatment types. For each treatment and species combination, $n=3$, except for high sulfur no plants, $n=2$.

Element	Control			Low Sulfur			High Sulfur		
	No Plants	<i>Juncus effusus</i>	<i>Eleocharis quadrangulata</i>	No Plants	<i>Juncus effusus</i>	<i>Eleocharis quadrangulata</i>	No Plants	<i>Juncus effusus</i>	<i>Eleocharis quadrangulata</i>
Li									
Conc. ($\mu\text{g/L}$)	0.10	0.15	0.08	59.68	65.18	75.16	61.83	72.91	60.48
% RSD	3.24	2.06	3.20	0.52	0.87	0.60	0.33	0.54	2.36
B									
Conc. ($\mu\text{g/L}$)	14.51	12.48	9.11	190.02	198.38	221.75	741.56	798.89	682.80
% RSD	0.93	1.01	0.84	0.42	0.84	1.08	0.63	0.39	2.12
Na									
Conc. ($\mu\text{g/L}$)	3449.53	1785.19	1859.32	4110.83	2655.35	3030.27	6339.09	4908.13	4966.53
% RSD	1.46	1.51	1.52	1.67	1.00	0.92	2.21	0.99	1.48
Mg									
Conc. ($\mu\text{g/L}$)	455.62	137.95	118.78	1752.92	1434.04	1699.77	1597.23	1339.67	1353.62
% RSD	1.41	1.70	1.34	1.97	1.54	0.80	2.23	1.30	1.44
Al									
Conc. ($\mu\text{g/L}$)	8.84	6.44	7.28	37.55	16.27	42.87	8.06	5.22	5.80
% RSD	2.44	2.01	4.62	2.12	2.49	1.92	6.69	3.52	7.69
K									
Conc. ($\mu\text{g/L}$)	480.64	620.56	283.11	1558.75	2338.12	1545.65	3535.13	4452.48	3440.26
% RSD	1.49	1.62	1.58	1.60	1.30	0.86	2.18	1.03	1.67
Ca									
Conc. ($\mu\text{g/L}$)	1306.52	438.35	341.47	9381.76	8279.08	9904.15	17553.67	22404.12	19214.50
% RSD	1.17	1.22	0.76	1.19	1.04	0.70	0.53	9.30	0.73
V									
Conc. ($\mu\text{g/L}$)	0.82	0.33	0.31	1.35	0.25	0.54	3.39	0.77	3.06
% RSD	1.58	2.31	3.72	1.68	3.54	2.28	1.37	2.01	0.65
Cr									
Conc. ($\mu\text{g/L}$)	0.28	0.26	0.29	0.33	0.29	0.28	2.84	0.62	2.41
% RSD	3.47	1.67	2.92	1.50	2.28	4.05	0.40	2.03	0.80
Mn									
Conc. ($\mu\text{g/L}$)	4.07	4.03	1.65	363.02	162.24	314.39	1.53	2.01	0.39
% RSD	1.04	1.40	7.75	0.86	0.45	0.50	1.81	1.74	13.05
Fe									
Conc. ($\mu\text{g/L}$)	3.79	5.74	2.99	4.66	5.56	2.10	2.98	45.41	2.32
% RSD	1.44	1.45	7.11	1.89	2.14	3.28	3.09	1.25	4.78
Co									
Conc. ($\mu\text{g/L}$)	0.08	0.09	0.02	3.29	0.78	1.51	0.17	0.10	0.06
% RSD	5.06	5.20	7.18	0.42	1.57	1.84	1.12	3.42	2.17
Ni									
Conc. ($\mu\text{g/L}$)	0.64	0.21	0.13	3.27	1.84	2.95	0.62	0.18	0.26
% RSD	2.13	5.67	5.64	1.01	0.42	0.86	1.04	2.86	3.00
Cu									
Conc. ($\mu\text{g/L}$)	1.23	0.25	0.25	1.08	0.36	0.32	0.55	0.19	0.32
% RSD	0.87	2.36	3.61	1.44	1.33	2.53	2.03	1.88	2.08

Element	Control			High Sulfur			High Sulfur		
	No Plants	<i>Juncus effusus</i>	<i>Eleocharis quadrangulata</i>	No Plants	<i>Juncus effusus</i>	<i>Eleocharis quadrangulata</i>	No Plants	<i>Juncus effusus</i>	<i>Eleocharis quadrangulata</i>
Zn									
Conc. (µg/L)	3.90	4.30	3.21	10.81	8.86	15.19	1.52	1.94	1.91
% RSD	1.44	2.32	1.80	1.22	1.19	1.21	6.21	2.27	1.71
As									
Conc. (µg/L)	0.18	0.10	0.04	1.01	0.57	0.92	0.58	0.39	0.48
% RSD	2.88	5.00	15.85	1.50	2.43	2.68	5.03	3.12	3.47
Se									
Conc. (µg/L)	0.05	0.02	0.01	1.50	0.88	1.00	1.10	0.84	1.01
% RSD	16.81	32.24	70.75	1.57	2.27	2.93	3.09	8.18	3.06
Rb									
Conc. (µg/L)	0.20	0.13	0.08	1.57	1.66	1.47	5.59	5.45	5.16
% RSD	6.71	6.27	6.85	2.22	1.37	1.74	1.31	0.98	0.94
Sr									
Conc. (µg/L)	8.94	1.47	2.30	143.21	144.04	158.39	98.70	98.41	100.77
% RSD	0.54	2.50	0.99	0.84	0.73	0.65	0.52	0.40	0.29
Mo									
Conc. (µg/L)	1.96	2.70	1.53	15.73	4.56	8.73	208.56	188.79	223.35
% RSD	6.10	4.06	3.81	0.32	0.37	0.50	0.77	0.44	0.40
Ag									
Conc. (µg/L)	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% RSD	25.45	73.03	0.00	22.28	161.21	82.09	32.89	748.40	85.33
Cd									
Conc. (µg/L)	0.20	0.19	0.13	0.28	0.21	0.28	0.26	0.23	0.21
% RSD	2.18	1.70	1.71	2.48	1.78	4.80	2.56	2.76	2.28
Cs									
Conc. (µg/L)	0.02	0.01	0.00	0.02	0.02	0.01	0.40	0.38	0.30
% RSD	14.60	20.61	0.00	9.30	4.02	9.33	1.57	1.22	3.85
Ba									
Conc. (µg/L)	4.12	1.34	2.02	14.57	21.31	17.78	18.41	15.97	30.26
% RSD	1.70	3.27	1.32	1.03	0.76	0.57	1.23	0.66	0.72
La									
Conc. (µg/L)	0.10	0.04	0.03	0.32	0.04	0.11	0.03	0.03	0.03
% RSD	2.02	4.66	3.11	1.29	3.98	1.18	3.25	3.64	3.02
Ce									
Conc. (µg/L)	0.12	0.02	0.02	0.75	0.03	0.16	0.01	0.01	0.00
% RSD	2.53	5.85	6.20	0.71	3.95	1.12	7.29	6.01	9.58
Nd									
Conc. (µg/L)	0.18	0.02	0.02	0.42	0.02	0.08	0.01	0.01	0.01
% RSD	0.84	8.20	7.49	2.00	6.07	4.28	5.85	9.00	6.59
Tl									
Conc. (µg/L)	0.01	0.00	0.00	0.28	0.16	0.17	0.05	0.11	0.08
% RSD	24.43	0.00	0.00	1.23	3.04	3.75	10.36	3.31	3.52
Pb									
Conc. (µg/L)	0.03	0.01	0.03	0.07	0.02	0.04	0.01	0.02	0.03
% RSD	3.98	7.22	5.58	1.75	6.41	3.86	5.49	3.98	4.25
U									
Conc. (µg/L)	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01
% RSD	11.50	12.18	20.17	8.81	34.05	18.25	1.12	2.96	7.67