**Table S1.** Mean concentrations in humus with standard deviations (in parentheses) in 2013 (before treatment) and 2015. Only chemical parameters for which all the data were above the detection limit are included. All concentrations are on a dry weight basis. Determinations were made in a 1 M NH4NO3 extract (M1) and after HNO3/HClO4 digestion (M2).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Ctrl | | N | | Ash | | Ash+N | |
| Parameter | Method | 2013 | 2015 | 2013 | 2015 | 2013 | 2015 | 2013 | 2015 |
| Al (mg/kg) | M1 | 0.15 (0.09) | 0.22 (0.20) | 0.20 (0.20) | 0.32 (0.42) | 0.18 (0.15) | 0.11 (0.16) | 0.37 (0.31) | 0.14 (0.15) |
| Al (mg/kg) | M2 | 2.78 (0.78) | 3.22 (1.09) | 3.36 (1.36) | 3.97 (2.22) | 3.83 (1.54) | 4.45 (1.65) | 3.86 (1.88) | 4.31 (2.22) |
| As (µg/kg) | M2 | 1.76 (0.82) | 1.88 (0.97) | 1.98 (0.71) | 2.27 (0.78) | 1.98 (0.68) | 1.92 (0.89) | 2.00 (0.82) | 1.95 (0.89) |
| B (µg/kg) | M2 | 5.34 (0.97) | 4.16 (0.62) | 4.47 (0.96) | 5.13 (0.97) | 5.16 (1.70) | 8.48 (3.75) | 4.93 (1.59) | 9.73 (4.40) |
| Ba (µg/kg) | M1 | 73.0 (17.1) | 69.9 (21.7) | 73.3 (29.4) | 75.6 (25.0) | 61.3 (19.2) | 164.8 (59.2) | 63.6 (13.8) | 177.0 (38.5) |
| Ba (µg/kg) | M2 | 83.9 (17.9) | 86.6 (21.0) | 85.2 (34.5) | 91.3 (26.5) | 73.2 (18.9) | 245.5 (111.5) | 74.2 (11.9) | 245.7 (89.0) |
| Ca (mg/kg) | M1 | 3.08 (0.70) | 2.64 (0.64) | 2.77 (0.83) | 2.78 (0.85) | 2.74 (0.88) | 7.28 (2.80) | 2.66 (0.91) | 7.50 (2.80) |
| Ca (mg/kg) | M2 | 4.24 (0.80) | 3.95 (0.67) | 4.04 (0.95) | 4.09 (0.91) | 4.39 (0.91) | 11.36 (5.22) | 3.95 (1.42) | 10.60 (5.00) |
| Cd (µg/kg) | M1 | 0.38 (0.16) | 0.35 (0.12) | 0.40 (0.13) | 0.43 (0.13) | 0.39 (0.19) | 0.26 (0.20) | 0.38 (0.16) | 0.26 (0.14) |
| Cd (µg/kg) | M2 | 0.59 (0.16) | 0.65 (0.17) | 0.66 (0.20) | 0.88 (0.33) | 0.65 (0.20) | 0.77 (0.22) | 0.69 (0.19) | 0.79 (0.22) |
| Co (µg/kg) | M1 | 0.42 (0.43) | 0.47 (0.53) | 0.45 (0.31) | 0.50 (0.37) | 0.45 (0.23) | 0.28 (0.25) | 1.26 (1.89) | 0.62 (0.79) |
| Co (µg/kg) | M2 | 1.46 (0.53) | 1.50 (0.70) | 1.73 (0.80) | 1.95 (1.16) | 1.82 (0.66) | 1.92 (0.54) | 2.69 (2.76) | 3.07 (2.84) |
| Cr (µg/kg) | M2 | 4.77 (0.98) | 5.37 (1.05) | 5.46 (2.07) | 5.79 (1.45) | 5.95 (2.12) | 10.91 (3.31) | 5.10 (1.16) | 8.65 (2.41) |
| Cu (µg/kg) | M2 | 7.69 (1.72) | 7.95 (1.86) | 7.98 (1.76) | 9.11 (1.78) | 7.23 (1.93) | 14.79 (7.79) | 8.62 (2.11) | 20.80 (19.96) |
| Fe (mg/kg) | M1 | 0.034 (0.019) | 0.028 (0.012) | 0.038 (0.029) | 0.036 (0.037) | 0.035 (0.019) | 0.015 (0.014) | 0.070 (0.078) | 0.017 (0.013) |
| Fe (mg/kg) | M2 | 2.54 (0.86) | 2.72 (0.90) | 2.87 (1.71) | 3.28 (1.72) | 3.48 (1.85) | 4.09 (2.42) | 3.46 (1.88) | 3.93 (2.16) |
| K (mg/kg) | M1 | 0.72 (0.12) | 0.60 (0.13) | 0.64 (0.15) | 0.54 (0.08) | 0.69 (0.20) | 0.68 (0.17) | 0.65 (0.17) | 0.71 (0.16) |
| K (mg/kg) | M2 | 1.07 (0.15) | 1.08 (0.21) | 1.01 (0.23) | 1.00 (0.13) | 1.18 (0.28) | 1.37 (0.26) | 1.02 (0.12) | 1.28 (0.27) |
| Mg (mg/kg) | M1 | 0.44 (0.10) | 0.43 (0.10) | 0.41 (0.10) | 0.55 (0.10) | 0.46 (0.11) | 0.86 (0.23) | 0.46 (0.10) | 0.94 (0.20) |
| Mg (mg/kg) | M2 | 0.69 (0.11) | 0.73 (0.11) | 0.76 (0.36) | 0.98 (0.43) | 0.84 (0.20) | 1.47 (0.45) | 0.74 (0.15) | 1.43 (0.30) |
| Mn (mg/kg) | M1 | 0.30 (0.14) | 0.24 (0.14) | 0.24 (0.10) | 0.21 (0.10) | 0.29 (0.17) | 0.45 (0.20) | 0.32 (0.29) | 0.50 (0.24) |
| Mn (mg/kg) | M2 | 0.39 (0.20) | 0.31 (0.18) | 0.30 (0.11) | 0.27 (0.13) | 0.38 (0.21) | 1.04 (0.68) | 0.43 (0.43) | 1.14 (0.89) |
| Mo (µg/kg) | M2 | 0.56 (0.15) | 0.51 (0.17) | 0.54 (0.17) | 0.49 (0.17) | 0.57 (0.17) | 0.39 (0.19) | 0.61 (0.20) | 0.54 (0.22) |
| Na (mg/kg) | M1 | 0.16 (0.03) | 0.14 (0.04) | 0.18 (0.09) | 0.14 (0.03) | 0.16 (0.05) | 0.16 (0.04) | 0.17 (0.04) | 0.15 (0.03) |
| Na (mg/kg) | M2 | 0.21 (0.03) | 0.25 (0.04) | 0.24 (0.07) | 0.25 (0.04) | 0.23 (0.05) | 0.29 (0.06) | 0.22 (0.03) | 0.25 (0.05) |
| Ni (µg/kg) | M1 | 1.70 (0.51) | 1.57 (0.61) | 1.74 (0.69) | 1.77 (0.63) | 1.54 (0.47) | 0.77 (0.59) | 2.00 (0.67) | 1.18 (0.92) |
| Ni (µg/kg) | M2 | 4.91 (1.15) | 5.09 (1.36) | 5.48 (1.73) | 6.07 (1.66) | 4.73 (1.11) | 5.87 (1.27) | 5.40 (1.20) | 6.98 (2.08) |
| P (mg/kg) | M1 | 0.14 (0.03) | 0.11 (0.03) | 0.12 (0.04) | 0.09 (0.03) | 0.12 (0.03) | 0.18 (0.09) | 0.10 (0.04) | 0.16 (0.10) |
| P (mg/kg) | M2 | 0.72 (0.13) | 0.80 (0.18) | 0.70 (0.17) | 0.81 (0.13) | 0.71 (0.15) | 1.09 (0.20) | 0.75 (0.17) | 1.17 (0.22) |
| Pb (µg/kg) | M1 | 4.54 (2.19) | 5.05 (2.17) | 5.11 (2.74) | 6.20 (2.97) | 4.68 (2.43) | 2.56 (2.07) | 5.07 (3.06) | 2.52 (1.33) |
| Pb (µg/kg) | M2 | 46.3 (15.4) | 45.5 (15.4) | 51.9 (18.4) | 59.3 (21.5) | 48.0 (18.4) | 46.8 (18.5) | 49.7 (17.8) | 52.5 (16.5) |
| S (mg/kg) | M1 | 0.105 (0.018) | 0.104 (0.021) | 0.103 (0.024) | 0.099 (0.010) | 0.097 (0.027) | 0.105 (0.025) | 0.110 (0.027) | 0.117 (0.028) |
| S (mg/kg) | M2 | 1.59 (0.30) | 1.84 (0.45) | 1.54 (0.37) | 1.88 (0.19) | 1.47 (0.37) | 1.72 (0.34) | 1.66 (0.32) | 2.01 (0.50) |
| Sc (µg/kg) | M2 | 0.90 (0.32) | 1.22 (0.58) | 1.15 (0.59) | 1.33 (0.61) | 1.26 (0.64) | 1.49 (0.57) | 1.17 (0.66) | 1.45 (0.82) |
| Se (µg/kg) | M2 | 0.79 (0.21) | 0.89 (0.32) | 0.79 (0.21) | 0.91 (0.40) | 0.83 (0.28) | 1.35 (0.43) | 0.83 (0.33) | 1.55 (0.70) |
| Si (µg/kg) | M1 | 34.4 (6.6) | 31.7 (8.6) | 27.7 (6.2) | 26.6 (5.6) | 30.4 (7.2) | 141.9 (142.8) | 32.4 (7.1) | 133.2 (129.3) |
| Sr (µg/kg) | M1 | 23.9 (7.4) | 22.6 (7.5) | 20.5 (7.3) | 21.3 (6.8) | 20.7 (7.2) | 39.2 (11.3) | 21.2 (4.5) | 40.6 (7.6) |
| Sr (µg/kg) | M2 | 33.1 (6.1) | 33.5 (5.6) | 30.2 (10.7) | 30.9 (7.8) | 34.3 (7.8) | 63.1 (19.5) | 30.9 (4.2) | 58.6 (15.6) |
| Ti (µg/kg) | M2 | 233 (101) | 185 (57) | 290 (147) | 215 (80) | 321 (157) | 203 (77) | 254 (111) | 186 (54) |
| V (µg/kg) | M2 | 10.4 (3.0) | 9.9 (2.9) | 11.0 (5.1) | 10.5 (2.8) | 13.9 (6.2) | 13.4 (6.1) | 10.9 (3.3) | 10.0 (2.8) |
| Y (µg/kg) | M2 | 2.6 (1.7) | 3.8 (3.8) | 3.1 (2.0) | 3.7 (2.8) | 3.0 (1.7) | 3.3 (1.3) | 4.7 (4.8) | 5.9 (6.7) |
| Zn (µg/kg) | M1 | 52.4 (17.2) | 47.6 (14.8) | 52.4 (16.1) | 51.6 (17.2) | 44.4 (22.9) | 23.4 (18.7) | 43.6 (18.9) | 24.4 (12.0) |
| Zn (µg/kg) | M2 | 66.7 (20.9) | 63.1 (17.8) | 66.2 (19.5) | 68.5 (20.3) | 57.1 (27.9) | 54.3 (19.7) | 56.5 (20.6) | 58.6 (13.3) |

**Table S2.** Results of Kruskal-Wallis tests (p values) of between-year and between-treatment differences in mean concentrations in humus for 2015. Only parameters included in Table S1 and for which one or more p values were significant are included. Determinations were made in a 1 M NH4NO3 extract (M1) and after HNO3/HClO4 digestion (M2). Significant results after Šídák corrections in bold face (critical value p < 0.0127 for between-year differences and p < 0.0085 for between-treatment differences in 2015).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Ctrl | N | Ash | Ash+N | Ctrl vs. N | Ctrl vs. Ash | Ctrl vs. Ash+N | N vs. Ash | N vs. Ash+N |
| Parameter | Method | 2013-2015 | 2013-2015 | 2013-2015 | 2013-2015 | 2015 | 2015 | 2015 | 2015 | 2015 |
| Al | M1 | 0.199 | 0.272 | **0.010** | 0.017 | 0.633 | **0.006** | 0.065 | **0.003** | 0.027 |
| B | M2 | **0.003** | 0.135 | **0.005** | **0.000** | **0.005** | **0.000** | **0.000** | **0.005** | **0.000** |
| Ba | M1 | 0.724 | 0.724 | **0.000** | **0.000** | 0.724 | **0.000** | **0.000** | **0.000** | **0.000** |
| Ba | M2 | 0.740 | 0.455 | **0.000** | **0.000** | 0.663 | **0.000** | **0.000** | **0.000** | **0.000** |
| Ca | M1 | 0.085 | 0.852 | **0.000** | **0.000** | 0.633 | **0.000** | **0.000** | **0.000** | **0.000** |
| Ca | M2 | 0.229 | 0.772 | **0.000** | **0.000** | 0.351 | **0.000** | **0.000** | **0.000** | **0.000** |
| Cd | M1 | 0.803 | 0.575 | 0.068 | 0.089 | 0.152 | 0.059 | 0.085 | **0.004** | **0.005** |
| Co | M1 | 0.917 | 0.724 | **0.004** | 0.059 | 0.520 | 0.115 | 0.468 | 0.034 | 0.520 |
| Co | M2 | 0.677 | 0.868 | 0.520 | 0.372 | 0.349 | 0.026 | **0.007** | 0.319 | 0.206 |
| Cr | M2 | 0.171 | 0.350 | **0.000** | **0.000** | 0.395 | **0.000** | **0.000** | **0.000** | **0.001** |
| Cu | M2 | 0.663 | 0.106 | **0.000** | **0.000** | 0.085 | **0.000** | **0.000** | **0.000** | **0.000** |
| Fe | M1 | 0.548 | 0.272 | **0.001** | **0.001** | 0.548 | **0.002** | 0.028 | **0.003** | 0.042 |
| K | M1 | 0.044 | 0.044 | 0.984 | 0.604 | 0.206 | 0.165 | 0.065 | 0.036 | **0.004** |
| K | M2 | 0.724 | 0.708 | 0.054 | **0.005** | 0.205 | **0.004** | 0.071 | **0.000** | **0.003** |
| Mg | M1 | 0.788 | **0.001** | **0.000** | **0.000** | **0.002** | **0.000** | **0.000** | **0.000** | **0.000** |
| Mg | M2 | 0.419 | **0.008** | **0.000** | **0.000** | **0.007** | **0.000** | **0.000** | **0.001** | **0.000** |
| Mn | M1 | 0.141 | 0.351 | **0.005** | **0.010** | 0.663 | **0.003** | **0.001** | **0.001** | **0.000** |
| Mn | M2 | 0.254 | 0.494 | **0.001** | **0.002** | 0.709 | **0.000** | **0.000** | **0.000** | **0.000** |
| Ni | M1 | 0.221 | 0.756 | **0.000** | **0.005** | 0.272 | **0.001** | 0.040 | **0.000** | 0.010 |
| Ni | M2 | 0.852 | 0.237 | 0.021 | 0.014 | 0.054 | 0.046 | **0.002** | 0.868 | 0.171 |
| P | M1 | **0.004** | 0.062 | 0.078 | 0.044 | 0.245 | 0.021 | 0.120 | **0.006** | 0.040 |
| P | M2 | 0.106 | 0.071 | **0.000** | **0.000** | 0.868 | **0.000** | **0.000** | **0.000** | **0.000** |
| Pb | M1 | 0.468 | 0.290 | **0.011** | 0.036 | 0.229 | **0.002** | **0.003** | **0.001** | **0.001** |
| S | M2 | 0.120 | **0.010** | 0.093 | 0.017 | 0.788 | 0.548 | 0.254 | 0.141 | 0.178 |
| Se | M2 | 0.557 | 0.767 | **0.001** | **0.004** | 0.752 | **0.004** | **0.007** | **0.009** | **0.006** |
| Si | M1 | 0.263 | 0.604 | **0.000** | **0.000** | 0.056 | **0.000** | **0.000** | **0.000** | **0.000** |
| Sr | M1 | 0.576 | 0.648 | **0.000** | **0.000** | 0.633 | **0.000** | **0.000** | **0.000** | **0.000** |
| Sr | M2 | 0.852 | 0.663 | **0.000** | **0.000** | 0.300 | **0.000** | **0.000** | **0.000** | **0.000** |
| Zn | M1 | 0.431 | 0.984 | **0.008** | **0.004** | 0.300 | **0.000** | **0.000** | **0.001** | **0.000** |