**Table SI1**: Percent change of organic matter, Carbon and Nitrogen mass loss, as well as percent change in the δ13C, δ15N and both lignin ratios across litter types and inundations (top = less inundated, bottom = more inundated, Table 1). All values are in % of change from the initial value after 170 days of exposure. These values are reported as median values followed by the standard errors. C is carbon, N is nitrogen, Lig:PS is the lignin-to-polysacharid ratio, LigG:LigS is the lignin guaiacyl-to-syringyl ratio.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Mass loss | C | | N | | | *δ*13C | *δ*15N | | Lig :PS | | LigG :LigS | |  | |
| OM type |  |  | |  | | |  |  | |  | |  | |  | |
| Leaves | 52 ± 2 | 29 ± 10 | | 48 ± 11 | | | -9.3 ± 2 | -32 ± 23 | | n.a | | n.a | |  | |
| Abs. roots | 22 ± 3 | 19 ± 4 | | 29 ± 7 | | | 0.0 ± 1 | -22 ± 23 | | -24 ± 43 | | 9 ± 84 | |  | |
| Transp. roots | 30 ± 4 | 26 ± 3 | | 47 ± 8 | | | -0.1 ± 2 | -43 ± 48 | | -148 ± 49 | | 26 ± 12 | |  | |
| Rhizomes | 24 ±4 | 22 ± 5 | | 32 ± 7 | | | 0.3 ± 1 | -46 ± 35 | | -2 ± 16 | | 7 ± 15 | |  | |
| Inundation |  |  | |  | | |  |  | |  | |  | |  | |
| SLI-40 | 31 ± 12 | 28 ± 10 | | 29 ± 12 | | | -0.4 ± 4 | -44 ± 43 | | -2 ± 61 | | 15 ± 104 | |  | |
| SLI | 26 ± 13 | 25 ± 9 | | 35 ± 10 | | | -0.6 ± 4 | -27 ± 44 | | -41 ± 73 | | 16 ± 20 | |  | |
| SLR30 | 26 ±13 | 21 ± 5 | | 42 ± 11 | | | -0.4 ± 5 | -27 ± 29 | | -68 ± 67 | | 21 ± 12 | |  | |
| SLR60 | 27 ± 13 | 23 ± 6 | | 45 ± 12 | | | -0.6 ± 5 | -45 ±28 | | -6 ± 88 | | 7 ± 41 | |  | |
| SLR100 | 24 ± 14 | 24 ± 6 | | 43 ± 13 | | | 0.15 ± 5 | -32 ± 31 | | -24 ± 40 | | 18 ± 15 | |  | |
|  |  | |  | |  |  | | |  | |  | |  | |

**Table SI2:** Principal molecules from the pyrolysis products detected from all litter types