Effects of early diagenesis on the isotopic signature of wood: incubation in aquatic microcosm

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Wood samples (cm-pieces and powders) were incubated in distilled water (DW) and river water (RW) to assess the effects of early diagenesis on carbon and nitrogen dynamics ($\delta^{13}C$ and $\delta^{15}N$). Bacterial activity (Biolog^{ECO}) was twice higher in DW than RW, although mass loss of wood pieces in RW was 3× greater than in DW (30% *vs* 10%). This difference was attributed to white-rot fungi that colonized the wood pieces in RW, whereas soft-rot fungi developed in DW. These results confirm that fungi are the main agents of degradation in wood, and that white-rot fungi are much more efficient than soft-rot fungi for wood degradation. Despite obvious degradation in both type of water, wood $\delta^{13}C$ was not significantly modified. In contrast, N dynamics showed complex and opposite patterns in both types of water, highlighting the strong impact of early diagenesis on the $\delta^{15}N$ of organic matter (unlike C). But, most of the $\delta^{15}N$ changes could be attributed to fungi that relocate N between wood and its micro environment in response to N-availability. Altogether, this suggests that early diagenesis may average an environmental signal by integrating the $\delta^{15}N$ values of individual signals (woods, fungi, water) and microbial processes.