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Differential fate of C and N from labile organic matter in intertidal mangrove sediments: results from an in situ ^{13}C-^{15}N labeling experiment.

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Intertidal mangrove sediments may receive organic matter inputs from a variety of sources, including those imported from the aquatic environment during tidal inundation. These organic matter sources are typically much more labile than those originating from the dominant local vegetation (i.e., root and litter inputs). In order to simulate the fate of tidally imported C and N in organic matter, 13C- and 15N labelled labile organic matter (a cyanobacterial culture) was applied in situ in different sediment cores under Avicennia marina in Gazi Bay (Kenya). The fate of the deposited material was traced over an 8-d period in different depth sections in both bulk sediment C and N, bacterial phosholipid fatty acids (PLFA), and total hydrolyzable amino acids (THAA). First, our results indicate a rapid preferential loss of C relative to N, with C/N ratios of recovered 13C and 15N label around $\sim$4

within the first three hours after the initiation of the experiment, compared to a ratio of 6.1 in the original material. This loss of C amounts to ∼30% of the initial C supplied, and likely reflects a rapid leaching and mineralization of N-poor compounds. After 8 days, ∼70% of the C, and ∼90% of the N present after 3 hours was estimated to remain in the top 10 cm. 13C data on bacterial PLFA confirmed the rapid bacterial assimilation of C: after 3 hours of in situ incubation, approximately 7% of the total remaining excess 13C was estimated to reside in bacterial biomass. 13C and 15N labeling in THAA showed that the majority of excess 15N (50-70%) was present as THAA, but this proportion was markedly lower for excess 13C (8-15%).