

Novel method to quantify decomposition of rhizodeposits

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Rhizodeposition of labile organic carbon is one of the main pathways linking above- and below-ground biota to affect soil carbon cycling. Rhizodeposition is also a strategic physiological process for plants to

cope with environmental stress, such as nutrient deficiency and drought, via the interaction with microbes. Nevertheless, separating decomposition of rhizodeposit carbon from root respiration in intact plant-soil systems has not yet been achieved due to methodological limitations, even though rhizosphere respiration has been intensively investigated.

Recently, Prof. Jiang Yong's Lab from the Institute of Applied Ecology of the Chinese Academy of Sciences (CAS) used a novel approach to separate soil respiration into root respiration, decomposition of rhizodeposit [carbon](#), and decomposition of soil [organic carbon](#) (SOC).

The researchers applied a ^{13}C pulse label to intact plant-soil cores and measured $\delta^{13}\text{C}$ values of the separate components of soil respiration simultaneously (i.e., root respiration, decomposition of rhizodeposit carbon, and decomposition of SOC). Then, two-source isotopic mixing models were used to sequentially separate root respiration and then decomposition of rhizodeposit carbon from total soil respiration rates in planted pots.

They found that the cumulative rhizodeposit carbon decomposition and root respiration, respectively, accounting for 7-31% and 52-76% of the cumulative soil respiration.

"The cumulative rhizodeposit carbon decomposition was of a similar magnitude to the cumulative SOC decomposition, indicating that rhizodeposit carbon decomposition is a fundamental process that should not be overlooked in studies of the terrestrial carbon cycle," said Prof. Jiang.

Related results entitled "A novel ^{13}C pulse-labeling method to quantify the contribution of rhizodeposits to soil respiration in a grassland exposed to drought and nitrogen addition" has been published online in

New Phytologist as a methods paper.

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More information: Ruzhen Wang et al. A novel ^{13}C pulse-labelling method to quantify the contribution of rhizodeposits to soil respiration in a grassland exposed to drought and nitrogen addition, *New Phytologist* (2020). [DOI: 10.1111/nph.17118](https://doi.org/10.1111/nph.17118)

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