



## **Temperature sensitivity of organic matter decomposition as regulated by oxygen and substrate availability**

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We investigated how substrate amount and quality affect the temperature dependency of enzymatic decomposition of soil organics leading to the production of CO<sub>2</sub> and N<sub>2</sub>O under aerobic and anaerobic conditions. Three substrates differing in microbial degradability (glucose with potassium nitrate, glycine, and phenylalanine) were added to a grassland soil at a range of concentrations. Soils were incubated at 21 and 1 % of O<sub>2</sub> content and at 10 and 20 °C.

Oxygen availability was a main factor controlling the reaction rates and temperature sensitivity of CO<sub>2</sub> and N<sub>2</sub>O production. The temperature sensitivity of CO<sub>2</sub> production was higher under aerobic versus oxygen-limited conditions, and the opposite dependency was observed for the N<sub>2</sub>O production.

Substrate availability was a second factor affecting the temperature sensitivity of the processes leading to the production of these gases. The temperature response was reduced under substrate limitation. This finding calls for further studies of temperature effect on soil organic matter decomposition under aerobic versus anaerobic conditions.