



Colimitation of decomposition by substrate and decomposers – challenging models by incubation experiments

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Decomposition of soil organic matter (SOM) is limited by both the bioavailable substrate and the active decomposer community. The understanding of this colimitation strongly affects the understanding of feedbacks of soil carbon to global warming and its consequences. This study challenges models of different formulations of SOM decomposition by experimental data of priming incubation experiments. The models are grouped according to the representation of decomposer biomass on the SOM decomposition rate a) non-explicit (substrate only), b) linear, and c) non-linear. The experimental data was taken from U. Hamer, & B. Marschner (2002 *Journal of Plant Nutrition and Soil Science* 165(3)), who incubated several ¹⁴C labelled substrates at 20°C in a model system that consisted of sand mixed with lignin for 26 days. The model calibration data consisted of the time course of the amount of respired CO₂ and the proportions of respiration originating either from added substrate or soil. We explore, if such short-term data can be used to discriminate between several formulations of the colimitation of decomposition. We find that several of the models can fit, i.e. explain, the experimental data sufficiently well. Hence, we suggest challenging models in addition to respiration data by additional constraints, such as amount and origin of substrate that is assimilated into microbial biomass and in different SOM pools.