Geophysical Research Abstracts,
Vol. 11, EGU2009-4840-19, 2009
EGU General Assembly 2009

Dynamic (redox) interfaces in soils - Carbon turnover in microbial food webs and impact on soil organic matter

E. Cyrus, A. Miltner, and M. Kästner

Helmholtz Centre for environmental Research - UFZ, Department of Environmental Biotechnology, Leipzig, Germany, phone: 49 (0)341 235-1757 (e-mail: esther.cyrus@ufz.de)

Abstract

The stabilization of soil organic matter (SOM) in soil is related to the interaction of organic compounds with interfaces, in particular those with mineral surfaces. For continuous stabilization of C, we hypothesize that dynamic interfaces are needed which can be created in soil by variations in water content and redox potential. Therefore, these factors are crucial for organic compound transformation by microbes in soil and their effects will be studied.

In our experiments, hexadecane and phenanthrene will be used as representative examples of aliphatic and aromatic compounds, respectively. Their transformation in soil and how this is affected by water content and redox potential will be studied in isotope tracer experiments.

The effect of different water contents and redox potentials as well as the effect of redox potential oscillations on their transformation will be studied in batch experiments with constant or oscillating water contents and redox conditions. Screening experiments with ^{14}C-labeled hexadecane revealed particularly interesting combinations of water content and redox potential. In soil column experiments, we will study the transformation of the same compounds in a gradient of water content and redox potential.

The data will reveal the distribution of the compound-derived C on mineralization, biomass formation and SOM related residue formation. They will also provide information on the flux of the C in microbial food webs related to the activity of selected functional genes.