



Spatial distribution of enzyme driven reactions at micro-scales

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Studies of microbial biogeography can often provide key insights into the physiologies, environmental tolerances, and ecological strategies of soil microorganisms that dominate in natural environments. In comparison with aquatic systems, soils are particularly heterogeneous. Soil heterogeneity results from the interaction of a hierarchical series of interrelated variables that fluctuate at many different spatial and temporal scales. Whereas spatial dependence of chemical and physical soil properties is well known at scales ranging from decimetres to several hundred metres, the spatial structure of soil enzymes is less clear. Previous work has primarily focused on spatial heterogeneity at a single analytical scale using the distribution of individual cells, specific types of organisms or collective parameters such as bacterial abundance or total microbial biomass. There are fewer studies that have considered variations in community function and soil enzyme activities. This presentation will give an overview about recent studies focusing on spatial pattern of different soil enzymes in the terrestrial environment. Whereas zymography allows the visualization of enzyme pattern in the close vicinity of roots, micro-sampling strategies followed by MUF analyses clarify micro-scale pattern of enzymes associated to specific microhabitats (micro-aggregates, organo-mineral complexes, subsoil compartments).