Compatibility of X-ray micro-Computed Tomography with Soil Biological Experiments

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Abstract

Combining X-ray micro-Computed Tomography (X-ray micro-CT) analysis with measures of soil microbial functioning would provide a powerful tool for revealing the influence of soil pore structure on soil organic matter (SOM) decomposition. We investigated the impact of X-ray micro-CT scanning on soil microbial functioning for the first time by assessing C mineralization, enzyme activities and microbial community structure by phospholipid fatty acid (PLFA) analysis 1 and 22 days after irradiation. There was no evidence for a disturbance of soil biological functioning following the X-ray micro-CT scanning, except for a small (but significant) decrease in dehydrogenase activity and a small (but significant) increase in the concentration of actinomycetes PLFA biomarkers. We conclude that X-ray micro-CT is fully compatible with soil biological experiments and that the combination of both may result in exciting new insights in the controls of soil pore architecture on soil biological experiments.