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# Effect of pyrogenic carbon addition on microbial community structure in forest topsoil

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Until recently, pyrogenic carbon (PyC, the incomplete combustion product of vegetation and fossil fuels(1)) was regarded as chemically and biologically inert(2). However, laboratory and field experiments (3-5) show that it is mineralized slowly to CO2 in soil. In addition, recent literature reports that PyC addition to soil can increase soil organic matter (SOM) decomposition rates (a priming effect) (6, 7) and the role of changes in microbial community has been suggested. However, PyC effect on the community structure of microbes and thus effects thereof remains obscure. To elucidate this question, we take advantage of our long-term field experiment at Lägeren forest (Wettingen, Switzerland) experiment that aims to establish the biological degradation processes of PyC in soil and specific microbial communities involved.

In our field experiment, we installed cylindrical mesocosms (15 cm long and 10 cm diameter) and at 2 cm depth from the surface we added 2.8g-C kg-1 of soil equivalent of PyC. The PyC added is highly labelled (13C 842‰ produced by charring Pinus ponderosa at 450° C under N2 atmosphere. We monitored the CO2 [U+FB02]ux (Infrared gas analyser) and $\delta$13C- CO2 (keeling plot) from the mesocosm to quantify the mineralization rate over one year. We observed +28 % of priming effect on SOM in PyC treated mesocosms in the first 10 months. These results are in accord with previous studies thus evokes an influence of microorganisms.

To investigate the role of microbial community structure changes on the observed priming effect, we extracted the mesocosms and sampled soils at different column depths (0–5, 5–10, 10–15 cm). We are analysing the soil sub-samples for microbial biomass changes using fumigation –extraction and 13C incorporation into the microbial biomass using 13C-PLFA analyses. Further, we will do microarray analysis, which has unprecedented potential to analyse changes in total microbial community as specific, sensitive, quantitative, and high-throughput tools for microbial detection, identification, characterization, using the 16S rRNA method. Thus, this communication aims to report the first results of this study to elucidate any shift in microbial structure. The changes (if any) in microbial diversity or functionalities could be linked with the effect of PyC in soil on the observed priming effect. In addition, this study will identify the microbial groups that are assimilating the PyC added to soil.

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