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Changes of soil functional diversity induced by the use of different fertilizers

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Agricultural practices like fertilization can change the structure and function of soil microbial community. Monitoring and assessing the soil microbiota and its dynamic related to different factors can be a powerful tool for understanding basic and applied ecological contexts.

An important tool to assess changes of community level physiological profile is MicroResp, a colorimetric method that uses a 96-well microtitre plate, 16 carbon sources and a detection plate to quantify the respiratory activity of the soil microbial community.

The main objective of this work is to assess the changes of the community level physiological profile when different fertilizers were used. In order to achieve this goal, a microcosm experiment was designed and performed under controlled temperature and humidity, and the soil samples were analyzed using the MicroResp technique.

The experiment was designed with two types of soil (chernozem and luvisol), four types of fertilizers (mineral fertilizer, mustard as green manure, slurry manure and cattle manure) with three replicates for each and a control.

Soil samples analyzed with MicroResp technique were prepared and loaded into the deep-well plates and incubated for six hours at 25 ^{o}C with the 15 carbon sources which were used at the concentration of 30 mg g^{-1} soil H_2O, one in each well and water as control. The detection plates were read with a spectrophotometer before and after six hours incubation at a wavelength of 570 nm.

Highest respiratory activity between the two types of soil used in experiment was given by the luvisol compared with chernozem. Regarding to the differences between the types of fertilizers, we observed that the highest microbial metabolic activity was given by green manure followed in order by cattle manure, slurry manure, control and mineral fertilizer with the lowest respiratory values. This pattern was same for both soils. However, highest respiratory activity was given by α-ketoglutaric acid, malic acid, oxalic acid, citric acid carbon sources, while the lowest respiratory activity was obtained in case of arginine.