



Changes of soil functional microbial diversity in organic and mineral fertilized soils

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Fertilization, as a key agricultural management strategy, has an important impact on soil processes and fertility. The activity of soil microorganisms can be a useful indicator to understand the belowground interactions and to predict changes in soil processes. The main objective of this study was to assess how the microbial functional diversity from two different soils is changing when different organic and mineral fertilizers are used in a short-term microcosm experiment under controlled conditions. A total of thirty microcosms were installed in a greenhouse using two types of soil (i.e. Luvisol and Phaozem), four fertilizers (i.e. cattle manure, green manure, slurry manure and mineral fertilizer) and one treatment without fertilizers as control. MicroResp multi-SIR method was used to assess the soil microbial functional diversity changes using 15 carbon substrates. The obtained results showed that the soil and the fertilizers had significant impact on the microbial functional diversity. The use of mineral fertilizer lead to lower microbial respiration rates while the use of organic amendments induced higher microbial activity. In addition, principal component analysis presents a clear separation pattern driven by the type of soil and fertilization in the first part of the experiment. The observed dynamics of the microbial community in PCA ordination graphs shows that the effect of fertilizers use decreased in time. This study shows that fertilization drives changes in soil microbial functional diversity, but the soil type is the main factor with higher impact on the microbial communities.