



The microbial perspective of organic matter turnover and nutrient cycling in tropical soils

Frank Rasche

Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), University of Hohenheim, 70593 Stuttgart, Germany (frank.rasche@uni-hohenheim.de)

A primary goal of low-input small-holder farming systems in the tropics is the appropriate management of organic matter (OM) turnover and nutrient cycling via adapted agricultural practices. These emphasize the promotion of soil organic matter (SOM) turnover and carbon (C) sequestration, nutrient use efficiency and soil microbial activity. Since soil microbial communities are acknowledged as key players in the terrestrial C and nutrient (e.g., nitrogen (N), phosphorus (P)) cycles, they may respond sensitively to agricultural management with shifts in their community structure as well as functional traits (i.e. decomposition, mineralization). This may be in particular evident for tropical, agricultural soils which show an accelerated microbial decomposition activity induced by favourable climatic and unique physico-chemical soil conditions. While modern molecular techniques advanced primarily the understanding about the microbiome and their functional traits interacting closely with SOM dynamics in temperate soils, tropical soils under agricultural use have been still neglected to a great extent. The majority of available studies revealed mainly descriptive data on the structural composition of microbial communities rather than questioning if detected structural alterations of the soil microbiome influenced key processes in N and P cycling which actually maintain ecosystem functioning and soil productivity. This talk highlights latest efforts in deploying molecular techniques to study the compositional status of soil microbial decomposer communities and their functional attributes in response to land use change and OM management in tropical agro-ecosystems.