16th International Conference on

Agriculture & Horticulture

conferenceseries.com

August 16-17, 2021

WEBINAR

Isabel Morales-Belpaire, Agrotechnology 2021, Volume 10

Response of soil quality indicators to different cacao production systems: A case study in a long term field trial in Alto Beni, Bolivia

Isabel Morales-Belpaire Universidad Mayor de San Andrés, Bolivia

Introduction: Parameters such as soil microbial biomass and soil enzymatic activities are often used as indicators of soil quality. An advantage of these values, as compared to more classical physico-chemical analysis, is their fast response to different management and cultivation methods. In temperate regions, studies have shown that organic agriculture gives lesser yields than conventional counterparts but gives more environmental benefits. However, data about the long term effects of organic management in tropical soils are still scarce, and quantification of environmental benefits such as impact on soil quality are needed in order to justify the yield gap.

Methods: Topsoils were sampled in two seasons (rainy season, March 2016 and dry season, June 2016) from a long term field trial stablished by the Research Institute of Organic Agriculture (FiBL) and local partners in Alto Beni (Bolivia). In this trial, there are five production systems: conventional monoculture, organic monoculture, conventional agroforestry, organic agroforestry and successional agroforestry. Additional soil samples were taken from land under fallow. Chemical and microbiological values were determined in the samples. A rough estimate of plant inputs to soils due to litterfall, prunings and herbaceous stratum was calculated for the different production systems.

Results: Undisturbed fallow soils showed higher values for microbial biomass and enzymatic activities and conventional monocultures generally showed the lowest ones. However, very strong seasonal variations were observed, microbial-related parameters were higher in rainy season. Spatial variation was also important. No direct relationship could be found with plant inputs to soil. A survey of literature shows that in many studies, seasonal variation has been overlooked or not given importance for interpreting results.

Conclusion: Microbial parameters were generally higher in undisturbed soils than any other production systems. Seasonal and spatial variations difficult the interpretation of the effect of soil management and should always be taken into account.

16th International Conference on

Agriculture & Horticulture

conferenceseries.com

August 16-17, 2021

WEBINAR



Figure 1. Microbial biomass carbon in dry (white bars) and rainy (gray bars) seasons for soils under five cacao production systems and fallow. Conv AF: conventional agroforestry, Org AF: Organic agroforestry, Conv MC: conventional monoculture, Org MC: organic monoculture, SAFS: successional agroforestry

Biography

Isabel Morales-Belpaire obtained her PhD in Biological and Environmental engineering at the "Université catholique de Louvain" (Belgium). She currently is professor and researcher at the "Instituto de Biología Molecular y Blotecnología" at the Biology Department of the "Universidad Mayor de San Andrés" in La Paz (Bolivia). She has authored publications about proteins in environmental matrices including soils, soil enzymes and microbial biomass, use of fungal enzymes for biodegradation and others.