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Soil organic carbon stocks under banana plantation and forest in mountain areas, southeastern Brazil

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Banana (Musa spp.) plantation in the mountain areas is an important economic activity in the municipality of Cachoeiras de Macacu, Rio de Janeiro state, Brazil. This study reports the initial results of monitoring of the soil organic carbon stocks (SOCS), as a soil quality indicator of an area at the Faraó Community under banana plantation in agroforestry system (AFS) and a neighboring area of remaining forest (reference). The monitoring was held on a family-based farm that receives support from a government program called Rio-rural. This program aims contribute to sustainable development in rural areas. In a slope dominated by Dystric Cambisols in each of the areas, nine small pits were sampled - three in each third of the slope (hillslope, middleslope, and footslope), at five depths (up to one meter deep). The SOCS were 40.5 Mg ha^{-1} at 0-30 cm and 79.3 Mg ha^{-1} at 0-100 cm deep in the AFS area and 45.5 Mg ha^{-1} at 0-30 cm and 104.2 Mg ha^{-1} at 0-100 cm deep in the forest area. The SOCS do not differ significantly between the AFS and the forest up to 30 cm, indicating that the AFS has good maintenance of the SOCS potential, probably due to the following integrated factors: (1) the characteristics inherited from the organic matter in the surface horizon of the native vegetation that concentrates stable organic compounds; and (2) agricultural practices of banana plantation, which causes little soil disturbance and leaves the crop remains in the field. On the other hand, the SOCS of the different uses up to 100 cm is significantly different ($p = 0.05$), indicating that in depths between 30 cm and 100 cm, the forest stocks more organic carbon in relation to agroforestry, probably due to the greater efficiency of the forest's root system to accumulate carbon.

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