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PARTICULATE ORGANIC CARBON IN AGROSYSTEMS IN THE BRAZILIAN SEMIARID

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Drylands cover about 40% of the planet, in which 44% are occupied with cultivated systems. Covering 45% of Brazilian Semiarid the grasslands are main land use this region. In order to increase biomass production and provide food for goats, sheep and bovines are implanted different agrosystems with differences species *Cenchrus ciliaris* L. (CC), *Opuntia ficus indica* Mill. (OF), *Gliricidia sepium* Jacq. (Walp.) (GS), *Leucaena leucocephala* Lam. De Wit. (LL). However, with removal of native vegetation (NV) there is a change in supply plant material and hence in soil organic matter (SOM), which is formed by substances in different stages of decomposition. Among the chemical components contained in SOM is carbon (C), the main structuring element of nature. In soils, the C can be in the form particulate organic carbon (POC), coming from the biotic residues being quite susceptible to change of land use, and mineral-associated carbon fraction formed by organomineral complexes that are not available to decomposition. POC is associated with the active compartment and can be lost more easily, depending on land use. In sense, to evaluate how the introduction of new species for animal feeding can modify the POC, soil samples were collected at following depths: 0-5, 5-10, 10-15, 15-20, 20-30, 30- 40 cm, with four replicates for uses with different ages: NV (always preserved), CC (30 yr), OF (21 yr), GS (17 yr) and LL (24 yr). The air dried soil was separated in a 53 μm sieve, where the particles larger than $>53 \mu\text{m}$ corresponded to POC. The C levels were determined in the LECO elemental analyzer. In the 0-5 cm layer CC showed the highest POC content (3.42 g kg^{-1}), in 5-10 cm depth NV had the highest POC content (3.12 g kg^{-1}) while in the other layers (10-40 cm), the GS and LL uses had the highest POC values. The OF use exhibited lowest POC content. Thereby, we can verify that GS and LL can be cultivated in semiarid region without compromising the levels POC, while the OF can be used but in consortium with other species, such as CC, that increase organic materials on soil and consequently increase C concentration. NV presented POC levels varying between 0.85 and 3.12, while the other uses had values between 0.78 and 3.42, which indicates that agrosystems when properly managed, there may be increase POC levels. Thus, ensuring higher C concentration and sustainability in agrosystems in the Brazilian Semiarid.

Keywords: land use change, grasslands, organic matter soil

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