

XXIII SIMPÓSIO BRASILEIRO DE RECURSOS HÍDRICOS

SOIL ORGANIC FRACTIONS OF WATERSHEDS IN ATLANTIC FOREST BIOME

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1. INTRODUCTION

The store organic carbon in soils is essential to determine the soils role as the source or sink of CO₂, CH₄ and N₂O, as well as the return processes involved in exchanging these gases between the systems soil-atmosphere-water. The soil organic matter can be classified into two fractions: the hydrophobic portion composed of non-humic substances and the hydrophilic portion composed of humic substances. Land use and management also causes changes in the soil humic composition. This research aimed to relate the individual fractions concentrations of the soil organic compounds as a function of the different land uses in two phytoecological regions located at Atlantic Forest biome.

2. MATERIAL AND METHODS

The study was carried at Concordia river basin (Lontras, Santa Catarina), an area of 30.74 km², presents the Atlantic Forest biome with the phytoecological region predominance corresponding to Dense Ombrophilous Forest (DOF) (45.11%); and Fortaleza river basin (São João do Oeste, Santa Catarina), with to Deciduous Seasonal Forest (DSF). Samplings were carried with four different land uses: native forest, pasture, agriculture and eucalyptus reforestation. Trenches were opened for sample collection in the layers 0-5, 5-10, 10-20, 20-30, 30-40, 40-60, 60-80 and 80-100 cm for determination of the non-humic substances, humic substances, humic acids, fulvic acids and humin. The ground and sifted soil samples were submitted to sequential extraction according to Ventura et al. (2018). Total carbon (TC) concentration was analyzed using the SHIMADZU total organic carbon analyzer (model TOC - V CPH). The elemental analyzer (CHNS) method was used to determine humin concentration (SATO *et al.*, 2014). The results were submitted to the statistical analysis: Shapiro-Wilk and ANOVA ($\alpha = 0.05$) in software R.

2 RESULTS AND DISCUSSION

The results obtained for the organic fractions concentrations of the soils in the DOF show that the highest concentrations occur in the soil layers into 0-20 cm range. In relation to land use, native

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forest presents the highest concentrations of non-humic substances present in the soil, while agriculture shows the lowest concentrations. For humic substances, humic acid and fulvic acid in the soil top layer, the native forest has the highest concentration, followed by eucalyptus, pasture and agriculture. Statistical analyzes using the mean concentrations of the non-humic substances from the soil layers by land use (Table 1) indicate significant differences between the uses corresponding to agriculture and native forest, as well as agriculture and eucalyptus.

Table 1 – Concentrations of soil organic fractions according the land uses in DOF and DSF.

ORGANIC FRACTIONS	LAND USES			
	<i>Native forest</i>	<i>Pasture</i>	<i>Agriculture</i>	<i>Eucalyptus</i>
DENSE OMBROPHYLOUS FOREST				
<i>Non-humic substances</i>	1.27a	1.00ab	0.59b	1.11a
<i>Humic substances</i>	80.09a	62.04a	55.37a	70.68a
<i>Humic acids</i>	4.09a	3.75a	2.36a	4.11a
<i>Fulvic acids</i>	31.03a	27.65a	13.71a	26.70a
<i>Humic acids</i>	49.06a	34.40a	41.66a	43.99a
DECIDUOUS SEASONAL FOREST				
<i>Non-humic substances</i>	0.74a	1.24b	1.29b	1.55b
<i>Humic substances</i>	104.01a	90.05a	62.15a	68.41a
<i>Humic acids</i>	2.70b	4.65a	5.37a	6.04a
<i>Fulvic acids</i>	41.61a	36.02a	24.86a	27.37a
<i>Humic acids</i>	62.41a	54.03a	37.29a	41.05a

Values followed by the same letter (lowercase) in the line does not differ significantly each other, Tukey (n.s. = 5%).

For the DSF, the organic substances concentration are higher at the soil surface and the concentration decrease occurs with increasing layers depth for most land uses evaluated. However, the native forest is the land use with the lowest organic substances concentrations, mainly in the soil top layer. In the DSF, the non-humic substances concentration present in the soil top layer are higher for land use corresponding to agriculture. The native forest had the highest concentration gradient of non-humic substances between the soil top layer and the depth of 100 cm, corresponding to 76%.

3. CONCLUSION

The soils organic fractions show highest concentrations in the soil layers at 0-20 cm range. In DOF, the native forest presented the highest organic substances concentrations, while agriculture shows the lowest concentrations. About DSF, the native forest is the land use with the lowest organic substances concentrations, mainly in the soil top layer.

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