

Soil carbon contents in integrated crop-livestock-forest and crop-livestock system in the Cerrado region

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Introduction

Integrated systems are considered an alternative to improve soil chemical and physical quality aiming the sustainable intensification in the Cerrado (Cordeiro et al., 2015). In this study it was evaluated the evolution of soil carbon (C) contents under integrated crop-livestock-forest (ICLF) and crop-livestock (ICL) systems from 2012 to 2016, after three and five years of adoption.

Material and Methods

The study area was located at Embrapa Cerrados Research Center, Brasília, DF, Brazil in the central plateau of the Cerrado region. The soil is classified as Oxisol or clayey Typic Dystrophic Red Latosol. The experiment was established in 2009 in a randomized complete block design with three repetitions. The soil samples (0-5, 5-10, 10-20, 20-30, 30-40 cm depth) were collected in 2012 and 2016 from ICL and ICLF systems. The ICLF system has a forest component of *Eucalyptus urograndis* planted in double lines with 2 m spacing between the trees and 22 m between rows. One sorghum crop and three soybean crops were cultivated between the rows on ICLF and in all area on ICL system, from 2009 to 2012. In February of 2012, after soybean harvesting, a mixture of sorghum/*Brachiaria brizantha* cv. BRS Piatã was sown intercropped. After sorghum harvest, the pasture of *Brachiaria brizantha* cv. Piatã was established. Two transects,

composed by 10 single soil samples per transect were taken and analyzed for total C contents in an elemental analyzer Vario Macro Cube (Elementar).

Results and Conclusions

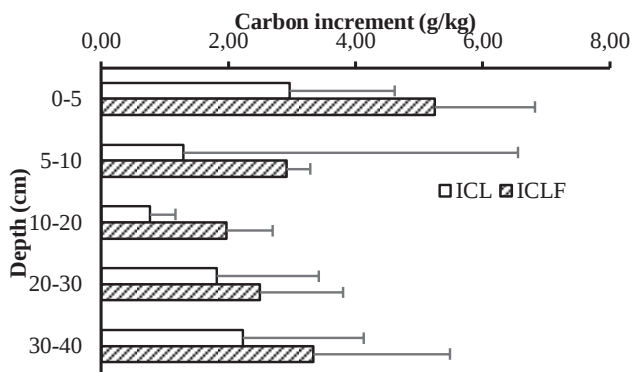


Figure 1. Soil C contents increment to 0-5; 5-10; 10-20; 20-30; 30-40 cm depth under ICLF and ICL between the years of 2012 and 2016.

Considering the increment in C contents between the years of 2012 and 2016, there were no significant differences ($p > 0.05$) between ICL and ICLF systems. However there was a trend where ICLF presented the highest increases in all depths (Figure 1). The ICLF system showed increments in the first three layers 43, 56 and 61 % higher than the ICL system, respectively. The higher carbon content for ICLF probably can be assigned to the contribution of eucalyptus plants litter and first thinning residues, however other factors such as roots and different grazing intensities can affect the soil carbon contents.

References

CORDEIRO, L.A.M.; VILELA, L.; MARCHÃO, R.L.; KLUTHCOUSKI, J.; MARTHA Jr. G.B.

Integração Lavoura-Pecuária e Integração Lavoura-Pecuária-Floresta: Estratégias para intensificação sustentável do uso do solo. Cadernos de Ciência & Tecnologia, v. 32, p. 15-53, 2015 **Acknowledgements** Embrapa (PECUS)