



**TITLE:** MICROBIAL ACTIVITY OF CERRADO SOIL SUBMITTED TO DIFFERENT GROWING AND FORAGE SYSTEMS

**AUTHORS:** MELO, I. G.1; COSTA, J. C.2; REIS, D. P.1; AGUIAR, F. M.3; OLIVEIRA, C. A.3; GONTIJO NETO, M. M.3; BORGHI, E.3; MARRIEL, I. E.1,2,3

**INSTITUTION:** 1UNIVERSIDADE FEDERAL DE SÃO JOÃO DEL REI, SÃO JOÃO DEL REI, MG (PRAÇA DOM HELVÉCIO, 74, CEP 36301-160, SÃO JOÃO DEL REI-MG, BRAZIL); 2CENTRO UNIVERSITÁRIO DE SETE LAGOAS, SETE LAGOAS, MG (AV. MARECHAL CASTELO BRANCO, 2765, CEP 35701-242 SETE LAGOAS-MG, BRAZIL); 3EMBRAPA MILHO E SORGO, SETE LAGOAS, MG (ROD. MG 424, KM 65, ESMERALDAS II, CEP 35702-098, SETE LAGOAS – MG, BRAZIL)

**ABSTRACT:**

Agricultural activity in Brazil, through different agricultural practices and inadequate management systems, has been affecting the environment over the years. Therefore, becomes essential to develop strategies on soil use aiming at greater sustainability of national agriculture. The focus of this study was to determine the changes in the biological quality of a Dystroferic Red Latosol (Oxisol) of Cerrado under farming systems of grains and forage. The study, carried out in an experimental area of Embrapa Maize and Sorghum, consisting of 11 arrangements (maize monoculture; maize and "*Brachiaria brizantha* cv. BRS Piatã" consortium; soybean monoculture; "*B. brizantha* cv. BRS Piatã" monoculture; consortium - soybean in annual rotation; soybean - consortium in annual rotation; consortium - pasture in annual rotation; pasture - consortium in annual rotation; pasture - pasture - consortium in 2 years rotation; pasture - soybean - consortium in annual rotation and natural Cerrado) and three depths (0-10, 10-20 and 20-40 cm). A randomized complete block design was used. The samples were collected in two seasons (September/2015 and July/2016). As bioindicators of soil quality, the activity of acid and alkaline phosphatases,  $\beta$ -glucosidase enzymes and the functional diversity were used, the first two were evaluated by the colorimetric method and the last by the Biolog system (Shannon Index (H), Total Activity (TA), Equity (E) and Substratum Wealth (S)). The results showed that there was no significant difference between the parameters evaluated for samples collected in September/2015, already for the samples of the July/2016, there was a significant difference ( $p < 0.05$ ) for acid phosphatase and functional diversity at the depth of 0-10 cm. The highest activity of the acid phosphatase enzyme was verified in the Cerrado soil and the lower in the maize monoculture with values of 10348,733 e 8590,660  $\mu\text{g p-nitrofenol h}^{-1}\text{g}^{-1}$  soil, respectively. The functional diversity showed higher TA in the system under soybean -

consortium rotation and lower in soybean monoculture with values of 23,78 and 1,07 respectively. For S, the consortium - soybean was the largest with 28 substrates, and the lowest was the soybean monoculture with 4. In relation to H, the highest index was for pasture - consortium in rotation for 2 years, reaching 3,05 and the lowest 1,67 in soybean monoculture. For E, only the soil under soybean monoculture showed value of 1,15, being superior to the others. The highest enzymatic activity and functional diversity was found at the depth of 0-10 cm due to the deposition of organic matter of the cultural residues in the soil. With these results, it is concluded that through the enzymatic activity of acid phosphatase and functional diversity, it is possible to detect the changes caused by the different cultivation systems in the soil biological quality.

**Key words:** biological quality, microbiological indicators and enzymatic activity

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