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MICROBIAL ACTIVITY IN SOIL CULTIVATED WITH SUGARCANE: EFFECT OF THE AMOUNT OF STRAW RETAINED IN THE SOIL

Rosana Faria VIEIRA⁽¹⁾; Ricardo Antônio Almeida PAZIANOTTO⁽¹⁾

⁽¹⁾ Embrapa Environment; Jaguariúna, SP; rosana.vieira@embrapa.br

Introduction - Sugarcane cultivation has gone through intense changes in the management practices due to the introduction of mechanical harvesting and the possibility of using nitrogen fixing bacteria (NFB). The use of this inoculant can reduce the use of nitrogen fertilizers without compromising culture productivity. However, mechanical harvesting generates significant amounts of straw, which are returned to the soil. The sugar-alcohol sector has questioned the amount of straw that should stay on the soil, considering its demand for energy purposes and the production of second generation ethanol. In order to develop and adopt sustainable management practices, one must quantify the possible impacts on the environment. Microbiological parameters have been widely used for this end, since they are more sensitive to changes in cultivation. The objective was to study the effect of maintaining differentiated amounts of straw on the soil, after harvesting the sugarcane, on some chemical and microbiological soil parameters. In all the treatments the sugarcane was inoculated with NFB.

Material e Methods - The experiment was carried out in Guaíra, SP, Brazil, using a random block experimental design. The treatments consisted of an area where the straw was removed (0 %) and areas where 36 %, 64 % and 100 % of the straw were left on the soil. The parameters evaluated were: the total carbon (TC) and total N (TN) contents, enzymatic activity of the soil (urease - UA, acid phosphatase - APA, and glucosidase - GA), total microbial activity as measured by the hydrolysis of fluorescein diacetate (FDA) and N immobilized by the microorganisms (N_{mic}). Soil samples (Red Acriferric Latosol) were collected at a depth of 0-15 cm two years and three months after implanting the experiment. The variables were submitted to an analysis of variance to determine the effect of the treatments, and Tukey's test was applied to compare the means when the effect was significant.

Results e Discussion - UA and APA showed no significant differences between the treatments, to the contrary of GA which was lower for the 0 % treatment. The FDA values also showed no significant differences between the treatments, whereas N_{mic} was higher for the 100 % and 64 % treatments, possibly showing a reduced loss of N to the environment when larger amounts of straw were retained in the soil. The TC and TN contents were not significantly different between the treatments, showing that these parameters are not always adequate to demonstrate alterations between agricultural practices.

Conclusions - The differences between the treatments with respect to glucosidase activity and N_{mic} showed the need for constant monitoring in areas cultivated with sugarcane, so as to better understand how the management can affect the microbial activity of the soil.

Keywords: soil enzymatic activity, sugarcane, microbial activity

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