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The influence of swine compost on bean production and soil carbon dynamic
Influence du lisier de porc sur la production de haricots et la dynamique du carbone dans le sol

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The viability of utilizing swine waste as compost, and its effects on the production of beans and on soil carbon dynamic, was studied in this work. The experiment was conducted at the EPAMIG Experimental Farm in Ponte Nova-MG-Brazil. The treataments consisted of applications of increasing doses of compost made from swine waste, sugar cane bagasse and gypsum (0, 8.75, 17.5, 26.25 and 35 $t.ha^{-1}$), with and without mineral fertilization (4-14-8, NPK - 500 $kg.ha^{-1}$), applied to the planting furrow. Soil samples were collected in depths 0 to 10 cm and 10 to 30 cm, at the flowering (1^{st} stage) and the harvest periods (2^{nd} stage) for chemical analysis.

The organic fertilization favoured the soil microbial activity, altering temporal and spacial availability of soil nutrients as well as increasing the carbon quantitative procedure from the CO_2 evolution system. The carbon losses by this way were more intensive in the first stage of samppling because of the greater availability of structural carbohydrates, and CO_2 dynamic was alterated by the mineral supplement. The availability of carbohydrates also affected the contents of water soluble carbon which were higher in the first stage than in the second one, presenting tendency to move from the superficial layer to the underlayer. This movement was apparently more intensive in the fully organic treatments than in the treatments with mineral supplement. The preferential formation of humic acids in relation to fulvic acids was verified in the first stage and it was more evident in the treatments using chemical fertilization.

It was verified an increasing tendency of great production in the organic treatments, with better response in 35 $t.ha^{-1}$ dose, and an oscillating tendency in the mineral supplied treatments, with better production in 26.25 $t.ha^{-1}$ dose. From the path analysis, it was observed the importance of organic components on bean production, through the straight effect of the humic acids and water soluble carbon on the increase of the productivity. Furthermore, it was found that the structural carbohydrates may contribute to reduce the productivity of the bean culture.

Keywords: carbon dynamic; swine waste, productivity of beans, Brazil
Mots clés : dynamique du carbone, lisier de porc, haricot, carbone du sol, Brésil