TITLE: EVALUATION OF ENZIMATIC ACTIVITY IN AGRICULTURAL SOIL AND TERRA PRETA DA AMAZÔNIA UNDER THE INFLUENCE OF BEAN GENOTYPES

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ABSTRACT: The soil organic P is made available to the plants through the process of mineralization, which is performed by microorganisms. This study has the hypothesis that tropical agricultural soils with low fertility present a greater mineralization of organic P due to the action of microorganisms which are more adapted to these conditions. In addition, we predict that the presence of plants with different efficiencies in the P uptake might influence the action of these microorganisms. In order to test this hypothesis, we evaluated the abundance of the 16S rRNA of Bacteria and *pho*D genes, and also the activity of acid and alkaline phosphatase enzymes in two types of soil (SA - agricultural soil with low fertility and TPA - Terra Preta da Amazônia with high fertility) in presence of two common bean genotypes that present different efficiencies in the P uptake (DOR - low efficiency and BAT - high efficiency). The experiment was conducted in a greenhouse during 45 days. The results were submitted to ANOVA followed by the Tukey's post hoc test and functional redundancy analysis (RDA). The RDA analysis showed that Mg, Cu and Fe were the main soil chemical parameters responsible for the distribution of the samples ($P < 0.05$). In addition, we observed soil type and genotype influenced both the abundance of the 16S rRNA Bacteria and *pho*D genes. In general, the 16S rRNA Bacteria gene presented a greater abundance in SA+BAT (3.42E + 07a), SA+DOR (4.71E + 07a) and SA+CONT (2.32E + 07a) when compared to TPI+BAT (1,44E + 07b), TPI+DOR (1,12E + 07b) and TPI+CONT (2,05E + 07b) treatments. For the *pho*D gene, we observed a greater abundance in the SA+BAT (1.57E + 06a) in comparison to the TPI+BAT (5,93E + 05c) TPI+DOR (4,80E + 05c) and TPI+CONT (5,26E + 05c) treatments. For the acid phosphatase enzyme, we observed a higher activity in SA+DOR (484a mg), SA+BAT (480a mg) and SA+CONT (397b mg) compared to TPI+DOR (317c mg), TPI+BAT (315c mg) and TPA+CONT (290c mg). On the other hand, we observed an increase in the alkaline phosphatase activity in TPI+BAT (205a mg) compared to TPI+DOR (133c mg) and SA+CONT (130c mg). Thus, our results indicate an higher activity of the acid phosphatase and the genes in the agricultural soil, which could be related to the lower availability of P in these soils.

Keywords: qPCR, *pho*D, 16S rRNA de Bacteria, phosphatase

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