

TITLE: ENDOGLUCANASE ACTIVITY IN CULTURES OF ACIDOBACTERIA ISOLATED FROM CERRADO SOIL

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ABSTRACT:

The Acidobacteria is an abundant phylum of bacteria found in soil, as revealed by 16S rRNA gene analysis from environmental samples. Acidobacteria can be found in a wide range of habitats from the Alps to hydrothermal vents, or even in oligotrophic soils such as the soil of the Cerrado. Due to its difficulty to grow on culture medium, there aren't many studies on their physiology or their biotechnological application. In contrast, several genomic and metagenomic studies were performed resulting in genome sequences deposited in databases. These studies revealed the presence of genes coding enzymes involved in the degradation of cellulosic compounds. In an attempt to obtain more information about these slow growing bacteria, we have obtained two Acidobacteria isolates from the Cerrado soil. The objective of this work was to demonstrate the production of cellulolytic enzymes by the isolates AB23 and AB60 obtained from the Brazilian Cerrado soil through enzymatic assay. The isolates were inoculated in VL-55 culture medium with 0.05% xylan as the sole carbon source and incubated for 30 days at a temperature of 22°C. After this period, the supernatant and pellet were separated by centrifugation for 15 minutes at 5000xg. Both culture fractions were lyophilized, and resuspended in acetate buffer pH 4.5. Subsequently, enzymatic assay was performed using the Megazyme Endo-Cellulose Kit and quantification of total proteins by the Bradford method. The enzymatic assay revealed that no endoglucanase activity could be observed in the supernatant of either culture. On the other hand, the pellet fraction of the isolate AB60 presented 138.8 mU/mL of endoglucanase activity, comparable to the activity observed on the purified cellulase from *Trichoderma* sp., which was 157.3 mU/mL. Isolate AB23 presented 49,2 mU/mL, lower value than positive control. These results indicate that the enzymatic activity is associated with the cell fraction of the culture, and not secreted to the medium. Finally, these results corroborate the previous genomic studies that Acidobacteria isolates AB23 and AB60 possess genes involved in cellulose degradation. Despite the positive result of this analysis, there is still much research to be done, these results are the first step towards a better understanding of the physiology and metabolism of the Acidobacteria phylum.

Keywords: soil microorganism, endoglucanase activity, quantification of proteins

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