

Title: PHYSIOLOGICAL CHARACTERIZATION OF AN ACIDOBACTERIA – SUBDIVISION 1 AND ITS IMPLICATIONS FOR ITS ABUNDANCE IN SOILS

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Abstract:

Members of the phylum Acidobacteria have been found in water samples, decaying wood, and in association with some animals; however Acidobacteria highest abundance is found in soils samples. In the Brazilian Cerrado soils, Acidobacteria subdivision 1 is highly abundant, but few isolates have been properly characterized. This work aimed to characterize one Acidobacteria from the Cerrado soil and to propose possible correlations between exhibited physiological features and its abundance in the soil. The Acidobacteria AB23 was evaluated using biochemical tests, which included enzymatic assays and the evaluation of growth in different substrates. This isolate was able to grow using carbohydrates such as glucose, arabinose, mannose, N-acetyl glucosamine, adipic acid, capric acid, citrate, cellobiose, xanthan gum, xylan, gellan gum, pectin, and cellulose (CMC and avicel). The growth on plant-derived polysaccharides is in accordance with the physiological description of other Acidobacteria found worldwide; which is consistent with the hypothesis that Acidobacteria play an important role in the carbon cycle by decomposing plant material. On the other hand, this bacteria is able to grow using bacterial-derived polysaccharides such as xanthan and gellan gum, indicating an interaction with EPS-forming soil bacteria. Furthermore, these bacteria exhibited the following enzymatic activities: catalase, β -glucosidase, β -galactosidase, alkaline phosphatase, acid phosphatase, naphthol-AS-BI-phosphohydrolase, esterase lipase (C 8), lipase (C 14), valyl arylamidase, and cystyl arylamidase. It is clear that this Acidobacteria possess a multitude of enzymes allowing the colonization of a broad range of habitats. Considering that soils provide a heterogenous habitat, it is likely that some Acidobacteria are able to shift from one or other sources of macronutrients. However, other ecological reasons for Acidobacteria abundance in soils must be further investigated, such as: competitive interactions with other bacteria and fungi, mechanisms of persistence in soils, and growth rates in natural habitats.

Keywords: Acidobacteria, Cerrado, characterization, biomass degradation.

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