ENZIMATIC CHARACTERIZATION OF A LIGNOCELULOLITIC *Phyllobacterium*

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ABSTRACT:

The higher energy demand for renewable energy sources leads to a increase in the biofuels production, whose potential comes from the recent setting of carbon, thus reducing the impact on the atmosphere. The biofuels classification is according to the material used to their production. Almost all ethanol producced nowadays comes from the fermentation of glucose present in the plants, being called first generation ethanol. This prodution method exclude most the lignocellulosic biomass, wich in turn is the raw material for second generation bioethanol. A recent research about bacterial biodiversity of the soil from brazilian Atlantic Forest, generated a collection of isolates, including some with lignocellulitic activity, such as *Phyllobacterium sp.* The main objective of this project is to identify lignocellulolytic enzymes for later biotechnological application. Initially, a taxonomic characterization was performed, by 16S rDNA sequencing, resulting in the recognition of *P. myrsinacearum.* This isolate was grown in a solid minimal media supplemented with avicel, lignin or sugarcane bagasse as sole carbon sources, aiming to the evaluation of the ability to metabolize such raw materials. In parallel, a liquid inoculum was prepared in the same media, during four days, to extraction of proteins. Protein extracts were quantified and separated on polyacrylamide gel. Genomic and proteomic tools will be used to identify enzymes of interest. *Phyllobacterium* cultures in minimal media supplemented with bagasse, avicel and lignin showed positive results. The Congo Red staining showed some degradation halos, proving the lignocellulolytic action of the bacterial enzymes. Intracellular and secreted proteins were extracted and separated on polyacrylamide gel for further identification by proteomics methods. The bacterial genome was completely sequenced by the method of Illuminasequencing. In this work, we verified that the *P. myrsinacearum* has lignocellulolytic ability. Possibly its enzymes can be useful for the bioethanol industry and the environment, once it will use biomass waste discarded in nature, allowing the decrease of chemicals used in the degradation of lignocellulose to provides glucose for the fermentation process.

Keywords: Bioethanol, celulases, bacterial bioprospection

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