DEVELOPMENT OF A MICROBIAL BIOINOCULANT AND EVALUATION OF HIS INFLUENCE ON THE DEVELOPMENT OF THE *EUCALYPTUS* SEEDING.

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Forest plantations compose approximately 264 million hectares of the global forest area. They represent a renewable source of raw material for industry, reducing the pressure over native forests and playing an important role in environment preservation. *Eucalyptus* is the main genus used in these plantations in tropics. This study goal is: i. to develop a microbial consortium with plant-growth promotion capacity, for use in *Eucalyptus*; and ii. to study the influence of the inoculation on plant development and over the functional ecology of rhizosphere. In order to achieve that, bacterial strains with high potential of phosphate solubilization, phytate mineralization and indol acetic acid production were selected to be used with pre-selected nitrogen fixing bacteria. The interactions between plants and microorganisms were evaluated in a greenhouse experiment with the following treatments: **i**. control; **ii**. fertilizer; **iii**. consortium; **iv**. consortium + fertilizer. The inoculation occurred during the monoclonal seedings generation and each treatment was replicated 27 times. Plant development parameters such as height, root dry weight, dry weight of shoot (stem and leaf) and mortality rate were monitored. Rhizosphere samples were collected and subjected to total DNA extraction and to whole genome sequencing. Around 300 bacterial strains were evaluated and four were chosen for consortium assemblage and plant inoculation. After 77 days of inoculation, results showed significant effects of both consortium and fertilizer (Two-way ANOVA), over the plant development parameters. The treatment consortium+fertilizer showed better results for plant height and dry biomass of leaves, stem and roots, with increases of around 65% on these parameters, compared to fertilizer, which is the approach used in the industry. Comparing survival rate of the seedlings, treatments consortium and consortium+fertilizer showed highest values (93%), followed by fertilizer (85%) and control (70%). Metagenomic profiling showed a clear effect of the fertilizer over the microbial community but did not detect influence of inoculation over total bacterial structure or functioning. Overall the proposed use of microbial bioinoculant technology for could be an important tool to enhance the efficiency of *Eucalyptus* cultivation.

Keywords: bioinoculant, consortium bacterial, *eucalyptus*, rhizosphere.

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