

TITLE: *HERBASPIRILLUM SEROPEDICAE* AND MAIZE PLANT INTERACTION UNDER SIMULATED STRESS INDUCED BY POLYETHYLENE GLYCOL 6000

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ABSTRACT:

The low availability of water is one of the main factors that can affect the growth and development of plants. In this sense, it is important to carry out studies on osmotic stress that can be simulated by the addition of polyethylene glycol 6000 (PEG 6000), a water reducing activity substance. Beneficial bacteria have been used as mitigating agent related to water stress. Therefore, the objective of this work is to evaluate the effect of stress simulated by PEG 6000 on maize plants growth (*Zea mays* L., var. Dekalb 7815) and root colonization by the bacterium *Herbaspirillum seropedicae*. To perform it, seeds were disinfected and placed to germinate in Gemitex paper for 72 hours. Seedlings with approximately 7-10 cm radicles were placed in pots (2L) filled with ½ of their capacity with CaCl₂ + PEG 6000 solution (286 mg.L⁻¹), an aliquot of 50 mL of inoculum containing 2x10⁷ mL⁻¹ cells *H. seropedicae* strain RAM10 (strain tagged with the gfp gene). The assay was performed in triplicate in a growth chamber with inoculated plants without PEG (Control) and inoculated plants + PEG. After seven days, plants were collected for determination of root length, fresh and dry matter. Epifluorescence microscopy was used to analyze root colonization with and without PEG induced stress. PEG-treatment markedly affect plant biomass with root length reduction of 39% related to the control. For the fresh and dry root matter it was observed a reduction of 88% and 34%, respectively. Fluorescence microscopy analysis revealed that the presence of PEG affected root architecture and the colonization pattern of the bacteria. Low numbers of bacteria cells attached as single cells or small aggregates were seen associated to the elongation and differentiation zone of the root surface. In addition, a polarized side epiphytic colonization was also noted at the root axis. It is concluded that the root-colonization by *H. seropedicae* strain RAM 10 was negatively affected by PEG with consequent reduction of plant growth.

Keywords: Water stress, plant growth promoting bacterium, Microbial inoculant

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