

**TITLE:** STRUCTURAL INTERACTION OF *Herbaspirillum seropedicae* AND MAIZE ROOTS IN THE PRESENCE OF HEAVY METAL POTASSIUM DICROMATE.

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**ABSTRACT:**

Heavy metals are serious soil contaminants been stable in nature and accumulated over time in the trophic chain. Phytoremediation represent a promising approach to reduce the level of several types of contaminants. However, certain contaminants can lead to poor metabolic activity and reduced plant growth. This situation can be corrected with the use of microorganisms that can promote plant growth. The objective of this work is to evaluate the root colonization by *Herbaspirillum seropedicae* and the growth traits of maize plants under the influence of the heavy metal potassium dichromate ( $K_2Cr_2O_7$ ). Maize seeds (*Zea mays* L., Dekalb var. 7815) were disinfected and germinated on Germitex paper for 72 hours in a BOD chamber. Seedlings with radicle of 7-10 cm were transplanted to 2L pots filled with 1L of calcium chloride ( $CaCl_2$ ) containing  $2 \times 10^7$  cells  $mL^{-1}$  *H. seropedicae* strain RAM10 and  $K_2Cr_2O_7$  100mg/L (contaminated) and group of inoculated plants without the presence of chromium (control) and were kept in the growth chamber. Seven days after inoculation nine seedlings were pooled into three groups (biological triplicates) and processed for biometric analysis for both treatments. Analysis of the effect of the contaminant on root colonization by the *H. seropedicae* was done by epifluorescence microscopy. It was observed a significant reduction in length (39.02% and 58.7%) for root and shoots in the presence of chromium, as well a reduction of root (83.84 and 63.63%) and shoot biomass (69.55 and 35%), respectively for fresh and dry matter compared to control. Fluorescence microscopy analysis revealed that the presence of  $K_2Cr_2O_7$  affected the spatial colonization pattern of the root axis by *H. seropedicae*, with few bacteria distributed as single cells and small aggregates attached to the root surface. It was concluded that the presence of the chromium affected the growth of the plant as well compromised colonization by *H. seropedicae*, reducing the bacterial population.

**Keywords:** Phytoremediation, Heavy Metal, Beneficial bacteria, Plant-growth promotion

**Development Agency:** FAPERJ, CAPES, CNPq, Newton Foundation, UENF.