TITLE: POTENTIAL OF COPPER BIORREMEDIATION BY *GLUCONACETOBACTER DIAZOTROPHICUS* ASSOCIATED WITH AQUATIC PLANT *SALVINIA AURICULATA*

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ABSTRACT: Contamination of ecosystems by metals has become an environmental problem. An alternative is the association between plant growth promoting bacteria and plants. *Gluconacetobacter diazotrophicus* is a promising bacterium for this process. Besides the characteristics of promoting plant growth, it also has resistance to metals. Studying their interaction with plants under stress conditions is essential for application in bioremediation processes. In this context, the objective of this work was to study copper resistance in *G. diazotrophicus* and to evaluate its remedial potential in the association with the model plant *Salvinia auriculata* Aubl. First, the genome of the bacterium was analyzed in the NCBI, Microbes Online and STRING, in the search for Cu stress response genes and the genes *copA* and *copB*, involved in the metal homeostasis were found. Subsequently, a Minimum Inhibitory Concentration (MIC) assay was carried out, where the bacteria were cultured in DYGS medium until the growth phase was reached and 3 drops (10 µL) were inoculated into 1 to 10 mM Cu plates. The plates were incubated in an oven at 30 ° C for 15 days. As a result, the bacteria resisted up to 8 mM and MIC of 9 mM. Then, metal sensitivity assay was performed in DYGS medium with Cu (0.1 to 4 mM) for 48 h at 30 ° C and 150 rpm, where the bacterium grew to 4 mM, with metal-induced morphological changes being observed. In the bacterium-plant interaction tests, *S. auriculata* was acclimated for 7 days in a greenhouse, in Hoagland and Arnold solution with 1/4 of the force. Then, 0.5 g of plant was incubated in 500 mL of the same solution for another 15 days in a greenhouse in the presence and absence of 10 mM Cu. Treatment with bacteria received 10^8 cells. After this period, fresh weight, electrolyte extravasation and photosynthetic pigments were evaluated. As a result, the inoculated plants showed significantly higher fresh weight when compared to the uninoculated and metal-treated plants (mean 2.7 ± 0.516 g and 2 ± 0.425 g respectively). The biomass increment was 30% for plants inoculated and treated with Cu. In the extravasation of electrolytes and photosynthetic pigments there was a trend of improvement in plants with Cu and bacteria in relation to plants with Cu. The association of *G. diazotrophicus* with *S. auriculata* was shown to be promising for bioremediation of contaminated aquatic environments, since the bacterium favored plant growth, alleviating the stress caused by the metal.

Keywords: Metal, Microorganism, Phytoremediation.
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