

**TITLE:** BACTERIA ASSOCIATED WITH *Salvinia auriculata* Aublet. PROMOTE PLANT GROWTH AND PROTECT PLANT AGAINST COPPER STRESS

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**ABSTRACT:**

Since the Industrial Revolution, anthropogenic activities have resulted in the contamination of fresh water by metals, cause serious threats to human health. Among these metals is copper, which is an essential micronutrient, but in high concentration it becomes toxic to living beings. Recently, the use of aquatic plants such as *Salvinia* has been proposed for phytoremediation. Associated with this plant are bacteria that exhibit different mechanisms to promote the growth of the plant, between them the one to protect the plant when it is in a situation of stress. The objective of this work was to isolate and identify plant growth promoting bacteria associated with *S. auriculata* with copper resistance. Initially, the bacteria were isolated in DYGS at 30 °C. The production of indole compounds was evaluated by the Salkowsky method, biological nitrogen fixation and phosphate solubilization by adding 0.8 g of  $\text{Ca}_3\text{PO}_4$  to the Basal. To analyze the metal resistance, a Minimum Inhibitory Concentration (MIC) assay was performed by adding Cu (1-9 mmol) in solid DYGS. The isolate with the highest resistance was inoculated in the plant using 500 mL of Hoagland solution, 1 g of plant and treatments containing Cu and bacteria. After 8 days in greenhouse, fresh biomass, dry biomass, chlorophyll content and electrolytes were evaluated. As result, 18 bacteria identified by sequencing the 16S rRNA gene were isolated; 1) *Agrobacterium tumefaciens* (1) *Bacillus toyonensis*, (1) *Bacillus megaterium* (1) *Bacillus* sp., (1) *Pantoea*, (2) *Enterobacter* sp., (1) *Siccibacter colletis*, (3) *Curtobacterium albidum*, (2) *Pseudomonas aeruginosa*, (1) *Pseudomonas fulva*, (1) *Pseudomonas mosselli*, (3) *Stenotrophomonas* sp. 12 fixed nitrogen, 8 produced indolic compounds and 16 phosphate solubilized. The most resistant bacteria to Cu were: *Enterobacter* sp. 9 mmol, *P. aeruginosa* 7 mmol and *A. tumefaciens* 5 mmol, the isolate *Enterobacter* sp. used in the inoculation assays. Plants inoculated with the bacterium in the presence of copper showed a significant increase ( $p \leq 0.05$ ) of fresh biomass 51.67% and dry biomass 62.5%. Chlorophyll content at 18.31% chlorophyll b 47.56% carotenoids 4.69%. He electrolytes increased 83.24% in the presence of Cu and in the presence of Cu with bacteria these were reduced. Thus, it was possible to find plant growth promotion bacteria and Cu resistant associated with *S. auriculata* and also to obtain a candidate isolate to make effluent bioremediation processes more efficient.

**Keywords:** Metal, Aquatic Plant, Microorganisms

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