EVALUATION OF THE BIOSORPTION POTENTIAL OF TOXIC METALS BY ENTEROCOCCS ISOLATED AQUATIC ENVIRONMENT

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ABSTRACT:

Pollution from toxic metals is an important problem due to its toxic effects and accumulation throughout the food chain, water, soil and sediment. This pollution began due to the accelerated development of industrial activities, through the irregular disposal of waste generated by activities such as mining, metallurgical processes, chemical industries, agriculture and contaminated effluents. The remediation of contamination by toxic metals by conventional methods is expensive, so bioremediation by microorganisms stands out as a tool for the decontamination of environments with toxic metals. The use of biosorption or bioaccumulation bacteria has gained much attention today because of its potential to provide an effective and economical means of remediation of toxic metals. Therefore, the objective of this work is to evaluate the resistance of *Enterococcus* spp. To toxic metals isolated from water bodies used for recreation of the city of Apucarana - PR. Isolation of the bacteria was performed by the filter membrane method and the isolates were identified by the polymerase chain reaction (PCR) technique. The analyzes of resistance to toxic metals were performed for metals copper, lead, zinc and chromium, following the maximum concentrations required by CONAMA Resolution 357/2005. The minimum inhibitory concentration (MIC) of the metals was carried out in broth and agar. Six isolates were identified as *Enterococcus* spp. The isolates presented significant growth in most of the concentrations tested by MIC in agar and only in the highest concentrations (10,000 to 40,000 times the maximum permissible concentration in the legislation) there was no growth for the toxic metals zinc and chromium. For the MIC test in liquid cultures, most of the isolates obtained a greater percentage of inhibition of growth in the concentration of 780 µg/mL for copper and zinc metals, with a greater percentage of inhibition of 62.5% and 86% for these two metals respectively. For chromium metal, growth inhibition occurred at the concentration of 195 µg/mL in most of the isolates. And for lead metal, the highest inhibition occurred at the concentration of 195 µg/mL, with 72.1% inhibition. Based on the results presented in this work, it is possible to identify bacteria with resistance to high concentrations of metals, which makes them a great potential to perform bioremediation.

Keywords: toxic metals, *Enterococcus* spp., biosorption, bioremediation.

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