

## EVALUATION OF MINIMUM BIOCIDAL CONCENTRATION OF ACID MINE DRAINAGE IN BACTERIA AND YEAST

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### Abstract:

Acid mine drainage (AMD) is one of the main environmental impacts caused by mining, which originated from the oxidation of sulphide minerals, producing sulfuric acid and lowering the pH of the medium. The acidic pH allows the solubility of heavy metals, however, the process is slow, and can be catalyzed by microbial action. The methods currently used in the treatment of effluent, consists of the application of substances that neutralize the pH, causing the precipitation of metals and feasibility of complexation. Nevertheless, the large volume of residue prevents the application of the technique in large areas, including the use of microorganisms with high resistance, an alternative mitigation of contaminated environments. The objective of this study was to evaluate the minimum biocidal concentration of acid mine drainage in bacteria and yeast. For the experiment was generated at lab an AMD (synthetic) from pyritic rejects over a period of 10 days by leaching column. Four microorganisms were selected (*B. cereus*, *K. oxytoca*, *C. albicans* e *S. cerevisiae*) from the collection of cultures of the La Salle University, and the pre-inoculum performed in LB Broth (Bacteria) and Malt Broth (Yeast), incubated by 24 h at 30 °C, in a volume of 10 mL. The minimum biocidal concentration was determined in 96 wells plate in duplicate, containing 200 µL of the effluent at concentrations of 0%, 10%, 30%, 50%, 70% and 100% of AMD, with the diluent LB Broth (Bacteria) and Malt Broth (Yeast), and 5 µL of pre-inoculum, incubated at 30 °C. The use of two controls without microorganisms to each diluent was carried out under the same conditions. After 72 h of incubation, 25 µL of each dilution were inoculated into Petry dishes containing Nutrient Agar (Bacteria) and Malt Agar (Yeast). The biocidal concentration was observed after 48 h of incubation at 30 °C, by the presence and absence of microbial growth. The concentrations tested in the study showed no biocidal effectiveness against the strains of *B. cereus*, *C. albicans* and *S. cerevisiae*. Nevertheless, the solutions with 70% and 100% of AMD showed capacity biocidal to *K. oxytoca*. The preliminary results indicated the potential of these microorganisms to survive to the effluent, that it has extremely acidic pH and contains high concentrations of solubilized heavy metals. Other studies should be conducted to investigate the minimum inhibitory concentration and the ability of these strains in bioreduction metals present in the effluent.

Keywords: Acid mine drainage, Microorganisms, minimum biocidal concentration.

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