ARSENIC BIOLEACHING FROM SILVER ORE CONCENTRATE

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Introduction: Minerals biotechnology or biohydrometallurgy, is a technique that uses microorganisms for the extraction of metals by bioleaching, biosorption or Biobeneficiation, among others (1). Biohydrometallurgy can be defined as the microbiological systems to recover valuable metals through its dissolution, as well as polluting elements elimination (2).
Mineral biotechnology has been useful to remove refractory minerals from minerals which require sufficient concentrations of elements in ores (3).
The present study was undertaken to evaluate the effects of pH and the concentration of pulp on arsenic (As) removal from lead-silver concentrated.

Methodology: Native bacteria from "La Parrilla" mine was spread in 500 mL baffled flasks with 100 ml 9K media(4), 10% inoculum, 30 °C, 160 rpm incubated for 22 days. The tests evaluated different pH values (2, 4 and 6) and pulp density (10, 20 and 30 %). Oxidation-reduction potential (Eh) and pH were monitored every 24 h. Arsenic content was evaluated in the mineral ore by optical emission spectroscopy with inductively coupled plasma.

Results: At a pH of 2, it was observed the highest percentages of arsenic bioleaching for all pulp densities (Fig.1). The best As removal, 10.65%, was found at a pH of 2 and 10% of pulp. In 20 and 30% pulp concentration, As bioleaching were, 5.79 and 3.88 %, respectively. Therefore, it was found that, high pulp density decreases the arsenic removal. This may be due to: (i) a better seudomixing and may have more homogeneous conditions for mass transfer; (II) decreases the possibility of particles ore sedimentation, and; (iii) there is more Fe (III) concentration, produced by microbial action, which are available for bioleaching less mineral ore concentration.

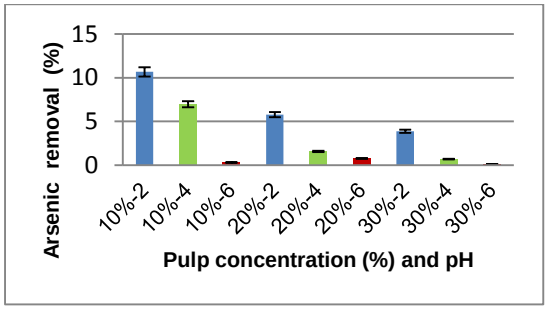

Fig. 1 Effect of pH and pulp concentration over arsenic removal.

Conclusions: Arsenic refractory element can be biologically removed from the concentrated silver ore. In Erlenmeyer flask level conditions, Arsenic removal was increased at low pulp concentrations and a pH of 2.

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