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Evaluation of mine tailings biooxidation from laboratory to pilot plant

Laura Muñoz, Orlando Ayos, Santiago Benavides, Darío Gallego and Marco Márquez
National University of Colombia, Colombia

In Colombia, tons of mine tailings are generated daily with gold or other precious metals unrecovered by traditional methods. Previous studies have shown that biooxidation, little known in the country, is an economical and environmentally accepted pretreatment. Bioprocess can increase the efficiency of extraction and is useful for exploiting secondary sources of metals. The aim of this work was the scale-up of the biooxidation process of mine tailings, from laboratory to pilot plant. Flasks, stirred tank bioreactors, tailings from La Marujamine (Caldas, Colombia) and *Acidithiobacillus ferrooxidans* as a biological agent were used. All assays were carried out for ten days and monitored by chemical measurements of iron, sulfates, pH and redox potential. To scale-up was taken into account parameters previously evaluated. The results in 250 milliliter flasks and 5 liter bioreactor were similar in all response variables, particularly in the iron removed percentage. The iron removed increased 9% in the 50 liter reactor. Otherwise, in the 4000 liter reactor (pilot scale) final concentration of iron removed was similar to 5 liter assays; however, the oxidation rates were slower at the beginning. The percentage of gold recovered was higher in assays in larger reactors. These results suggested that the scale-up was successful about the gold recovered, but there are conditions to be controlled at pilot level to improve the oxidation kinetics.

Biography

Laura Muñoz has completed her Bachelor's degree in Biological Engineering from National University of Colombia, and currently pursuing a Master's degree in Science-Biotechnology at the same University. She is a Researcher of Bioprocess and Applied Mineralogy Group (GMAB) and Symbiotic System (SS).