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A study on the selection of indigenous leaching-bacteria for effective bioleaching

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Bioleaching technology, which is based on the ability of microorganisms to transform solid compounds into soluble and extractable valuable elements that can be recovered, has been rapidly developed in recent decades for its advantages, which include mild reaction condition, low energy consumption, simple process, low environmental impact and being suitable for low grade mine tailings and residues. The bacteria activities (survival, adaptation of toxically environments etc.) in the bioleaching technology play a key role in the solubilization of metals. The purpose of this study was to selection of optimal leaching-bacteria through changed pH and redox potential on bio-oxidation in batch experiments for successful bioleaching technology. Twenty three indigenous bacteria used throughout this study, leaching-bacteria were obtained from various geochemical conditions; bacteria inhabitation type (acid mine drainage, mine wastes leachate and sulfur hot springs) and base-metal type (sulfur, sulfide, iron and coal). Bio-oxidation experiment result was showed that 9 cycles (1 cycle – 28days) after the leaching-bacteria were inoculated to a leaching medium, pH was observed decreasing and redox potential increased. In the bacteria inhabitation type, bio-oxidation of sulfur hot springs bacteria was greater than other types (acid mine drainage and mine wastes leachate). In addition, bio-oxidation on base-metal type was appeared sulfur was greater than other types (sulfide, iron and coal). This study informs basic knowledge when bacteria apply to eco-/economic resources utilization studies including the biomining and the recycling of mine waste system.