

BIOHYDROMETALLURGY – METAL RECOVERY WITH MICROORGANISMS, FUNDAMENTALS, PROCESS OPTIONS, AND BIOMINING APPLICATION

Biohydrometallurgy offers various process options including bioleaching, biooxidation, biomineralization, bioprecipitation, biosorption and bioelectrochemistry. The purpose of biohydrometallurgical research is to explore these process options for metal recovery from primary and secondary resources. Bioleaching and biooxidation have been developed over the last decades towards industrial application for processing of sulfide ores, termed biomining. The biomining share of the global cobalt, copper, nickel, zinc and gold production is between 0.4 % and 1.9 % for each metal according to the most recent estimates. Future biomining applications may include in situ bioleaching, various complex, low-grade sulfide ores, mine tailings as well as oxide ores such as limonitic laterites. Also secondary resources such as electronic scrap have become a promising target for biohydrometallurgy. The recovery of metals from metal-rich process waters, acid mine drainage and industrial wastewaters has been studied in several projects and has begun to be an industrial reality. An overview on recent developments in biohydrometallurgy including bioleaching fundamentals for exploiting the metabolic potential of specialized microorganisms will be given. There is a high chance that biohydrometallurgy will play a greater role for metal recovery in future.