

# Role of Microbial Technology in Mineral Processing

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## Abstract

Biomineral processing is a field of metal extraction from ores, concentrates, rocks and solutions under impact of microorganisms and/or their metabolites. Most successful application of biotechnology, so far is on copper, uranium and gold ores. Various physicochemical parameters, such as the biomass, availability of CO<sub>2</sub>, particle size, mineralogy of the ore, and pulp density, influence the bioleaching rates. The sulphide minerals are oxidized to acid ferric Sulphate by the *Ferro bacillus* group of bacteria. Ferric iron is an excellent oxidant for extraction of metals from their respective ores. Treatment of effluents from the mineral industry by microorganisms, with incidental recovery of some metal values, constitutes an equally important area of biotechnology. Live and immobilized microorganisms have a very important role in mineral engineering. Biological leaching of mono- and multiple-sulphides is an established commercial process. The flotation of minerals, the alteration of flotation characteristics of minerals, the flocculation of ferric slime and phosphatic slime, removal of cyanide and other toxic chemicals discharged from mineral engineering operations are potential areas where significant advances in the application of microorganisms are likely to have commercial viability. Genetically engineered microorganisms and the development of improved strains will enhance the overall application of biotechnology to the mineral industry. The idea of using heterotrophic bacteria and fungi in leaching is receiving attention at present. Application of biosorption, bioaccumulation, biodegradation and bioreduction are confirming the important role that microorganisms can play in reducing the environmental impact of processing mineral resources.