Influence of heterotrophs on activity of autotrophic bacteria during leaching of Sulphidic ore

Zafar Mahmood Khalid
Department of Bioinformatics and Biotechnology, International Islamic University, Islamabad, Pakistan
zafarmahmood@iiu.edu.pk

Abstract

Metal solubilization, applying bacteria Acidithiobacillus spp is being done for the recovery of copper and uranium by heap, dump and in situ leach techniques on a commercial scale, It is estimated that around 35 % of total copper is obtained through bacterial leaching processes. It is also observed that in the Biological community in an ore leaching process in addition to autotrophic bacteria (Acidithiobacillus spp., Leptospirillum ferrooxidans and Sulfolobus spp.) some heterotrophic microorganisms, including bacteria and fungi of various species are also found. These bacteria are also used as catalysts in the biomining process. To check the role of heterotrophic bacteria in presence of autotrophic bacteria lab scale experiments were performed. Carbonate bearing sulphidic ore from Rammelsberg mine in Goslar, Germany containing Cu, Fe, and Zn was tested for solubilization with strains of Acidithiobacillus ferrooxidans and Acidithiobacillus thiooxidans alone and in combination. The role of one of the heterotrophs in the microbial leaching process will be discussed. Chemical reaction of heavy metals sulphide by this acid as well as ferric iron resulted in production of sulphur in the form of passive film/layer. Effectiveness of Acidithiobacillus thiooxidans in removal of this passive film was also investigated. It was found that presence of heterotrophs in leaching process in lab scale studies negatively influenced the leaching efficiency of Acidithiobacillus spp.