

USE OF MICROBIAL PROCESSES IN THE EXTRACTION AND RECOVERY OF METALS

by

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Introduction

Man has exploited many natural microbial processes for thousands of years in such well known activities as brewing, wine making and food preservation. With the advances in technology these processes have now being developed into large industrial enterprises and form a part of a broad discipline currently known as Biotechnology; which is really the application of science and engineering to biological processes for the production of materials, beneficial to the society.

The application of microbial processes for the extraction and recovery of metal, is probably the least publicized and perhaps the most underestimated of all aspects of microbial technology. This is commonly known as microbial leaching or biomining.

Microbial processes are currently used for leaching metals from low grade ores and for the concentration and recovery of toxic, but valuable metals from dilute solutions of industrial waste water (effluent). This is mainly a concern of environmental management.

The objectives of the article is to publicize the wide scope of microbiology and also to popularize the technology in the hope that some basic research on this will be initiated in Sri Lanka.

Microbial leaching of metals was often described as an emergent technology of the eighties. This term is used to describe the solubilization of metals such as copper and uranium from the ores using microbial processes. In an industrial operation of microbial leaching acidified water is made to percolate through heaps of broken, low grade ores (Fig 1). Such heap may contain from 1×10^5 - 1×10^9 tons of rock. Within the heap bacterial activity results in mineral sulfide oxidation and release of metal. The solution is then collected when it drains from the heap and is processed to recover the metal. The residual liquid containing H_2SO_4 , Fe^{+2}/Fe^{+3} is recycled back to the heap.