

Mining with Bacteria



Bacteria colony (*Thiobacillus ferrooxidans*) of leaching microbes (electron micrography X 7500). These bacteria digest pyrite or iron sulfide and release the precious metals.

(GB Biotech Inc.)



The largest biological leaching reactor in the world. The tank measures 6.5 m in diameter and 7.2 m in height. This reactor is located near Goldbridge in British Columbia.

(GB Biotech Inc.)

The history of bacteria for use in the mining industry began in 1947 when two researchers in British Columbia attempted to explain why abandoned coal mines produced acid concentrations. They discovered that a bacterium, *Thiobacillus ferrooxidans*, exists at the bottom of a mine. This bacterium can accelerate, by hundreds of thousands of times, the natural conversion of pyrite into sulphuric acid. This process, called metal bioleaching, can be used to release precious metals contained in the pyrite.

GB Biotech Inc. of Burnaby, British Columbia, is one of the two or three world leaders in the use of bacteria for the concentration of gold and silver ores. The concentration operation is carried out in a reactor. The company has built the first biological leaching plant in North America to recover gold and silver from ore and concentrates with a low sulphur content. The biological leaching process developed by GB Biotech is now being marketed, and the company expects eventually to use the same process in the open air, spraying the bacterial solution over ore piles.

Coastech Research Inc. of North Vancouver, British Columbia, is involved in research and development in the mining field and offers its services to the mining industry. Among other aspects, the company is interested in the use of micro-organisms for the extraction and recovery of metals from ore, concentrates and mining waste. The firm works mainly on the biological leaching of gold, but it is also interested in copper and other metals.

With government support, Denison Mines Limited of Elliot Lake, Ontario, has been successful in developing a biological leaching process that can be used for the underground extraction of uranium.

Bacteria could also be used to eliminate mining waste, a source of pollution mainly because of its sulphur content. Recbiomine Inc. of Sainte-Foy, Quebec, has installed a pilot laboratory to develop a process for the biodegradation of mining waste. The company expects to market this process in due course.