

Low temperature sulfides bioleaching for high mountain and pre-mountain sites.

DESCRIPTION

This innovation consists of a new low temperature sulfide bioleaching process for high mountain and pre-mountain ranges. This process uses a consortium of new psychrotolerant strains of *Acidithiobacillus ferrivorans*, called Puri, Yaku and *Acidithiobacillus* sp., Called Uma, as inoculants.

All of them are capable of growing in low temperature ranges (5 ° C to 10 ° C), oxidize the ferrous ion and reduced sulfur compounds, and all have the ability to form biofilms on solid supports.

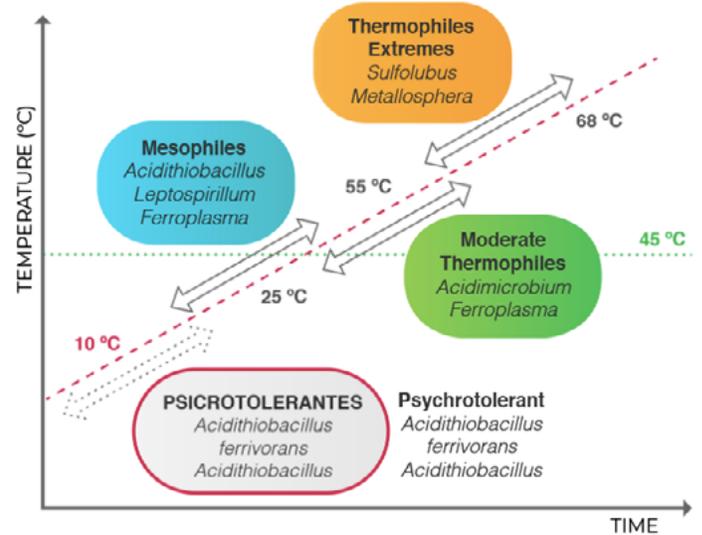
The generation of these biofilms allows the continuous production of an inoculant solution from fixed-bed bioreactors filled with inert support materials, colonized with the consortium of psychrotolerant bacteria.

OPPORTUNITY

In the process of obtaining minerals, particularly copper, there is the alternative of using microorganisms to extract it from sulphided materials of this mineral. This process, called bioleaching, has been gradually developed and incorporated in the industry.

For the system to be incorporated more massively, better performance is required in the mining environments of Chile. This requires having bacteria and archaeas suitable for dissolving metals and appropriate environmental conditions for their growth, with temperature being a fundamental parameter of the process.

The high mountain range climate of our country causes difficulties for this process, since it currently requires significant energy costs for the preheating of the leaching solutions and significant efforts to maintain the temperature in the piles.



▲ Different groups of microorganisms, according to their optimal bioleaching temperature.

APPLICATIONS

- Bioleaching in piles in high mountains, pre-mountain ranges or where low temperatures occur.
- Acid bioleaching in landfills (ROM). ROM dumps are generally free systems, whose control is more difficult than that of a battery due to their characteristics (size, grain size, etc.)
- Obtaining shorter starting times in traditional leaching piles.

ADVANTAGES

1. The bacteria used allows bioleaching of copper at low temperatures (between 5 ° C and 10 ° C), a range typical of mining tasks found in desert areas and at high altitudes.
2. The use of these microorganisms allows copper to be obtained without the use of complementary systems for heating cells.
3. It is a process that uses less acid consumption.

INTELLECTUAL PROPERTY

Biotechnologies of Water Ltda., UXMAL S.A. and COPEC-UC Foundation

Invention patents:

- Peru: "Acidithiobacillus strains for bioleaching processes at low temperatures". Register No. 9242.
- Chile: "Bacterial strains isolated from Acidithiobacillus capable of adhering to solid supports separately or in consortium to form a biofilm, process for continuous inoculation of an inoculant and its uses of the strains in bioleaching processes of sulfur minerals". INAPI N° 0250-2012.

INVENTOR



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TEAM



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We are a research and development, consulting and marketing company for products related to the detection and control of environmental, microbiological and biomineral contamination.

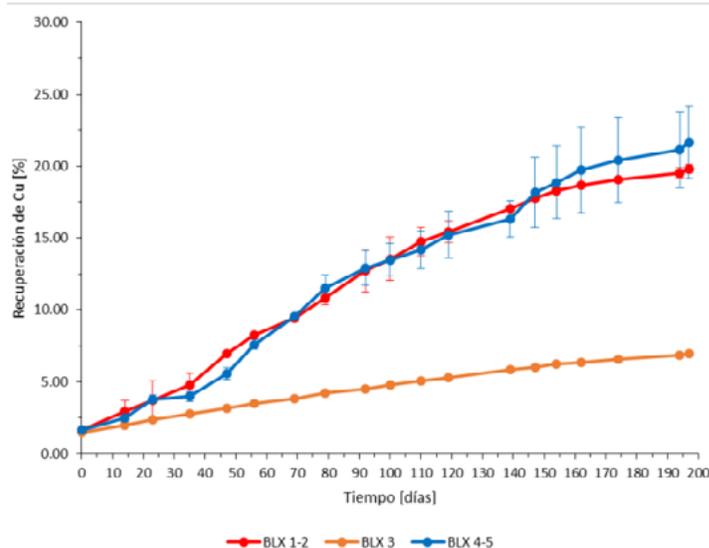
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STATE OF TECHNOLOGY DEVELOPMENT

The technology is proven at the level of bioleaching columns.



- ▲ Bioleaching of a copper sulphide mineral
- BLX 1 y BLX2: psychotolerant consortium (7,6 °C)
 - BLX 4 y BLX5: mesophilic consortium (26 °C)
 - BLX 3: Sterile control

FOR MORE INFORMATION

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