

BBS/BBF ENCAPSULATED MICROORGANISMS TECHNOLOGY FOR SOLID INOCULATION, THE NEXT STEP TO NOT USE WATER IN BIOLEACHING PROCESSES WITH HIGH PERFORMANCE

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Industrial hydrometallurgical processes using copper oxides and mixed oxide/sulfide exhibit high concentrations of several ions in their raffinates that hinder the treatment of copper ores with microorganisms because they are strongly affected by ionic impurities. On the other hand, water costs and hydric balance of processes in some mining sites, especially in desert areas, make it impossible to use fresh water for the dilution of toxic solutions and compatibility of the microbial activity in the bioleaching process. A strategy to address this in bioleaching applications has not been solved with an economical sustainable way.

CodelcoTech (Ex-BioSigma) has patented a new biomining microorganisms managing technology named BioSigma Bioleaching Seeds or BBS. This technology consists of encapsulated microorganisms using a natural matrix, conferring protection to cells and different additional advantages for the process.

Based in this technology a new strategy emerged, the use of BBS modified technology as a biofilter (BBF) for achieve 100% compatibility with raffinate solutions where BBS achieve just 75% for extreme toxic raffinate cases.

In order to demonstrate the potential for this integrated BBS/BBF technology, experimental columns using 100% raffinate solution with copper sulfide ore and encapsulated biomining consortium were established. The results show ferrooxidant activity (ORP over 600mV) past 100 days with 43% of copper recuperation in the BBS/BBF case, 16% more than the control without BBF that did not present ferrooxidant activity.

The data shows the remarkable advantages for the use of BBS/BBF technology in a complex bioleaching process, resolving water consumption in bioleaching, a critical variable in mining operations in northern Chile.

Key words: BioSigma Bioleaching Seeds Technology, Copper Sulfide Ore, Encapsulated Biomining Consortium