Linnaeus ECO-TECH 2022
Kalmar, Sweden, November 21-23, 2022

THE MICCUR PROJECT FOR IMPROVED COPPER RECOVERY FROM CHALCOPYRITE

***Mark Dopson*[1]**
***Michael Schlöman*[2]**
***Ansgar Poetsch*[3,4]**
***Sue Harrison*[5]**
***Mario Vera*[6]**
***Alvaro Videla*[6]**
***Jana Pinka*[7]**
[1)] *Linnaeus University, Sweden*
[2)] *Technische Universität Bergakademie Freiberg, Germany*
[3)] *Ocean University of China, China*
[4)] *Ruhr University Bochum, Germany*
[5)] *University of Cape Town, South Africa*
[6)] *Pontificia Universidad Católica de Chile, Chile*
[7)] *G.E.O.S. Ingenieurgesellschaft mbH, Germany*

Abstract
Bioleaching of copper minerals is usually performed in engineered heaps and this technology accounts for approximately 15-20% of the worldwide copper production. Presently there is an increase in the demand for metals while commercial biomining of chalcopyrite (the largest copper resource in the world) is not extensively employed due to slow metal release and limited copper recoveries. In this project, two laboratory-scale, proof-of-concept experiments to increase the efficiency of industrial bioleaching of chalcopyrite containing ores will be scaled up to ultimately reach demonstration in pilot bioheaps. Both strategies are aimed at excluding *Leptospirillum ferriphilum* that as a 'strong' iron oxidizer, raises the redox potential above the desired range for efficient chalcopyrite dissolution at moderately thermophilic temperatures. The first strategy is to maintain the redox potential of a chalcopyrite bioleaching system in the favorable range by using 'weak' iron oxidizing microbes such as *Sulfobacillus thermosulfidooxidans* and the second strategy exploits the lower tolerance of *L. ferriphilum* to chloride ions (i.e. salt tolerance) as compared to *S. thermosulfidooxidans*. In addition, it has been demonstrated that signal molecules control biofilm formation on pyrite and it will be tested if they suppress the growth of *L. ferriphilum* when grown on chalcopyrite. Although proof-of-concept strategies to suppress *L. ferriphilum* have been described, the project aims to elucidate how the desired microbial consortium can be maintained in the large-scale bioheaps employed by industry.

Keywords: biofilm, bioheap, biomining, chalcopyrite, redox potential

ISBN: 978-91-89460-85-0