Geophysical Research Abstracts
Vol. 20, EGU2018-16282, 2018
EGU General Assembly 2018

Evolutionary investigation of the biomineralization of dolomite by EPS-forming bacteria from an extreme saline environment, Lagoa Vermelha, in Rio de Janeiro, Brazil

Bianca Brenha (1), Douglas Galante (), Rob van Spanning (), and Mónica Sánchez-Román ()

(1) Institute of Biology, University of Campinas; Brazilian Synchrotron Light Laboratory - LNLS/CNPEM (bianca.brenha@lnls.br), (2) Brazilian Synchrotron Light Laboratory - LNLS/CNPEM (douglas.galante@lnls.br), (3) Vrije Universiteit Amsterdam, The Netherlands (m.sanchezroman@vu.nl; rob.van.spanning@vu.nl)

The precipitation of dolomite in the Earth's modern sedimentary environments occurs, for the most part, mediated by microorganisms. The way in which bacteria are capable of facilitating or inducing mineral precipitation has not yet been fully elucidated. However, it is known that extracellular polymeric substances (EPS) secreted by bacteria facilitate the mineral nucleation and precipitation by creating an ideal physico-chemical environment for mineral formation, in this case, of dolomite. The secretion of EPS is widespread among microorganisms and can perform several roles, including a common mechanism for protecting extremophiles from adverse conditions. In the present project, the bacterial capability of bioprecipitation of dolomite was investigated and will represent a major step towards understanding the biomineralization phenomenon occurring in extreme saline environments since a geomicrobiological and biogechemical perspective. The water and sediment samples collected from Lagoa Vermelha (Araruama, RJ) were used for microbial isolation and subsequent identification by 16S rRNA of EPS forming bacteria at CNPEM in Brazil. Here report, the capability of those microbial isolates to precipitate carbonate minerals at low temperatures and different physicochemical conditions (UV radiation; salinity, liquid and solid media). The survival of the bacterial colonies has been analyzed during the course of the biomineralization culture experiments according to the different physico-chemical conditions, used in the different culture experiments, by counting colony forming units and optical density analyses (OD). In this way, it will be possible to verify if bacteria capable of precipitation of biominerals, like dolomite, are more tolerant to conditions of extreme environments, in relation to the others that live in the same environment. This study has huge implications for the search for life on Mars, since the current martian surface conditions are strong oxidative atmosphere, UV radiation and low temperatures, among others.