

BIOMEX on EXPOSE-R2: Preservation of cyanobacterial biomarkers after Martian ground-based simulation exposure

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The space mission EXPOSE-R2, successfully launched on the 24th of July 2014 to the International Space Station, is carrying the BIOMEX (BIOlogy and Mars EXperiment) experiment aimed at investigating the endurance of extremophiles and stability of biomolecules under space and Mars-like conditions¹. Among the selected extremophiles there are cyanobacteria of the genus *Chroococcidiopsis* well known for their relevance in astrobiology tasks dealing with the search for life on Mars and for future space applications²⁻⁴. During the ground-based simulations, *Chroococcidiopsis* cells mixed with two Martian mineral analogues (phyllosilicatic and sulfatic Mars regolith simulants) were exposed to high UV irradiation combined or without Martian simulated atmosphere. Survival and preservation of potential biomarkers such as photosynthetic, photoprotective pigments or DNA were assessed by colony forming ability, Confocal Laser Scanning Microscopy, Raman spectroscopy and PCR-based assays. DNA and photoprotective pigments (namely carotenoids) showed high preservation potentials and were detectable after simulations of the real space exposure mission (500MJ/m² of full UV 200-400nm irradiation and Martian simulated atmosphere). Data gathered during the ground-based simulations will contribute to interpret future results from space experiments and guide our search for life on Mars and other bodies of interest.

Références

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