

The BIOMEX space experiment: biosignatures detected after ground-based Science Verification Tests (SVT) in space and simulated Mars conditions

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The BIOlogy and Mars Experiment (BIOMEX) is part of the European Space Agency (ESA) space mission EXPOSE-R2 in Low Earth Orbit (LEO), aiming to expose microorganisms for 1.5 years to space and simulated Mars-like conditions on the International Space Station (ISS). In preparation of this mission, dried colonies of the Antarctic cryptoendolithic black fungus *Cryomyces antarcticus* CCFEE 515, grown on Martian and Lunar analogue regolith pellets, were subjected to several ground-based preflight tests, Experiment Verification Tests (EVTs) and Science Verification Tests (SVTs). These tests aimed to verify i) the resistance of our model organism to space stressors when grown on extraterrestrial rock analogues and ii) the possibility to detect biomolecules as potential biosignatures in reference to support the Exomars 2020 mission. Here some results are reported showing the outcome of the SVTs, the last set of experiments, where the effect of UV radiation was analyzed if combined with simulated space vacuum or simulated Mars-like conditions. The analyses performed by Gas Chromatography-Mass Spectrometry showed the presence of fungal metabolites, as azelaic acid, that remain unaltered after the different expositions and treatments. In addition first results of Raman Spectroscopy analysis on melanin will be presented. Further investigation is necessary to derive the appropriate parameter set for Raman spectroscopy of melanin. Transmission Electron Microscopy (TEM) observations showed different results in preservation of cell's ultrastructure.