



Can we expect habitable niches for cyanobacteria on Mars?

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The most resistant cyanobacteria can be found in tropic deserts and in polar and alpine habitats. The reason for their resistance can be explained by their occurrence in intensely irradiated, very dry and/or cold environments which are supposed to be as close as possible similar to Martian surface conditions. A systematic approach comparing measurements on photosynthetic activity of cyanobacteria in relation to measured environmental parameters obtained in Mars analog field sites with data collected from space exposed samples or during Mars simulation experiments will show differences and common results after analyzing the investigated organisms. Some of the investigated species are foreseen to be exposed during the next ESA-space-exposure experiment BIOMEX either directly to real space conditions on space exposure platforms like EXPOSE-R2 on the International Space Station or to Mars simulation conditions in a Mars simulation chamber. Some of the species were still exposed to both of the extreme environmental conditions and some of the results will be presented and might serve for future investigations as references. We will emphasize that in parallel monitoring of environmental parameters on Mars analog field sites was performed as well as partly in space and in the simulation chambers. This experimental combination might help to get a better impression about the influence of each of the tested parameters on metabolic activity of the tested cyanobacteria in complete different planetary environments comparing characterized habitats on our home planet Earth with those we might expect according to recently observed data on Mars. The outcome of this work could be relevant to classify e.g. Mars as a habitable planet by a new combination of different experimental and biological approaches and to evaluate and discuss the likelihood of terra forming Mars in the far future.