Changing the Martian Atmosphere: Examining Lichen's Effect on Oxygen Percentage in a Simulated Martian Atmosphere

Dreesbach, Fiona (School: Hayfield Secondary School)

The European Space Agency established that fruticose lichen species were capable of surviving in the vacuum of space due to their resilient upper cortex protecting them from UV radiation and the cold (Paul, 2007). This was further expanded upon by the German Aerospace institute where it was found that fruticose lichen species have the ability to photosynthesize normally in a simulated Martian environment (Paul, 2010). What these studies have in common is a gap in research, none of them discuss lichen’s impact on the simulated environment. This project aims to prove that lichen has the capability to replicate Earth’s paleoproterozoic era so that critical planetary research may be better conducted. The hypothesis for this research was that if lichen is able to grow for a period of seven days in a simulated Martian environment, then the percentage of oxygen would increase significantly. This research was conducted previously in 2021 with inconclusive results due to insufficient methods leading to contaminated results. The current results seem to indicate that the hypothesis was correct with an increase in Oxygen within a simulated Martian atmosphere containing a 0.1oz sample of cladonia rangiferina lichen (a species of fruticose lichen) being 2.7%, well above the given margin of error of 0%-1%. Further research must be conducted to conclusively determine lichen’s ability to alter the atmospheric chemistry of Mars but this primary research indicates that fruticose lichen could be a solution to one of the major hindrances to Martian planetary research.

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