A FUTURISTIC GREEN THUMB ON MARS: A PRELIMINARY STUDY WITH LETTUCE

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Globally, increasing human population growth and urbanization have imposed restrictions on the availability of arable land. The space colonization is the one of the solution for this issue. In our solar system, mars has the next basic requirements for life, though they are minimal. Among others, food supply is a prerequisite for the space colonization. Unlike our planet, food production in an eco-friendly manner is very important, if we are to save at least the next planet we will colonize. Chemical inputs in modern agriculture are the major culprit in many environmental problems. At present, good agricultural practices like the use of biofertilizers minimize the chemicals without lowering crop yields. Among biofertilizers, biofilm biofertilizers (BFBFs) have shown the potential in large scale safe application. Objective of the current study was to investigate how to minimize the usage of chemical fertilizers (CF) in futuristic Martian agriculture. Eight different treatments with BFBF and reduced CF rates (up to %) were applied to a Martian soil simulant (serpentine soil) in order to determine its effect on plant growth. Each treatment consisted of 3 replicates in a CRD. Lettuce was used as the test plant. After 46 days, plants started to die. However, some parameters of the simulant soil were improved. Compared to the initial soil simulant, both BFBF and CF treated simulant showed significant improvements in moisture, labile carbon, nitrate and non-diazotrophs and a decrease in extractable nickel. Thus, the BFBF may improve the Martian soil conditions for at least subsequent plant growth. However, further studies are needed to investigate this in real Martian soil and environmental conditions.

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