Microorganism Activity Enhanced Biochar as Biological Improvement to Martian Regolith

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This study investigated Martian soil and different way to enhance the soil for plants to grow on Mars because the soil on this planet is not able to support life let alone grow food. I tested whether the addition of azotobacter vinelandii and rhizophagus intraradices impacted soil pH level, nitrogen, potassium and phosphurs levels. As well as germination count with and without an added CO2 gas influence. Adding microbial inoculum to biochar-amended Martian soil regolith within a CO2 rich environment will establish root growth and plant height compared to biochar-amended soil alone. I conducted NPK analysis tests and pH level tests on each sample between all four groups, including the control Martian soil simulation. Samples include Martian simulated soil, biochar plus Martian soil, Martian soil plus biochar plus fungi and Martian soil plus biochar plus bacteria. Data was analyzed using Kruskal-Wallis test. A p-value of <0.0001 was obtained from pH data. Results showed that the additives to the Martian soil produced higher nitrogen and phosphorus levels compared to the Martian soil alone. The treatments also significantly changed the pH level for each group. These results indicate that the soil on Mars can not support plant growth for long periods of time and that in order to eventually have astronauts on the planet, the soil needs to charge or additives need to combined. This suggests that there is still a way for humans to live on the red planet.

Awards Won:

Missouri University of Science and Technology: $2,500 tuition scholarship (renewable for up to 4 years)