Regolith Bioremediation for the Cultivation of Medicago sativa

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The colonization of Mars entails considerable challenges, particularly in food production, due to the lack of nutrients and the presence of toxic compounds in the Martian regolith. This research aims to study the bioremediation potential of the fungus Pleurotus ostreatus to improve Martian soil conditions and support the growth of Medicago sativa. The question of this investigation is how Pleurotus ostreatus can improve Martian soil for the cultivation of Medicago sativa. The hypothesis states that bioremediation will enhance soil properties and contribute to the growth of Medicago sativa. The experiment involved mixing simulated Martian regolith with Pleurotus ostreatus substrate and planting Medicago sativa seeds. The results were that Medicago sativa did not germinate in untreated Martian regolith, but it successfully germinated in the presence of Pleurotus ostreatus. This supports the hypothesis and demonstrates the effectiveness of Pleurotus ostreatus in the bioremediation of the Martian soil. This method poses a viable solution to enable plant growth on Mars, by reducing unfavorable Martian soil conditions through biological processes. Even though this research is limited by the fact that the simulated regolith used cannot mimic real Martian soil conditions, its findings have implications for agricultural challenges on Earth, and for food security in extreme environments. This research offers a sustainable option to address toxicity and nutrient deficiency on Mars and Earth soil.

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