Agricultural Implications of Extraterrestrial Colonization

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With the reality of space colonization approaching, questions related to living on extraterrestrial planets remain unanswered. Among these is “How will we grow food on extraterrestrial colonies?” Transporting soil from Earth is an option, but requires a large amount of storage space. Working off of this principle, I sought to discover if a mixture of Earth soil and an extraterrestrial soil would enable the growth and development of Spinacia oleracea with reduced input of earthen soil. I chose to compare the effects to two different types of Earth soil: potting soil and organic compost and mix them with two different simulation soils: LHS-1, a lunar simulant, and MMS-2, a Martian simulant. I mixed various concentrations of potting soil and compost with the LHS and the MMS regoliths, never exceeding a 50:50 ratio. I documented germination rates and, at the conclusion of the growing period, the plant lengths, leaf lengths, root lengths, leaf quantities, and dry mass weight. In conclusion, S. oleracea grew in all of the potting soil/LHS combinations and in the higher concentrations of compost/LHS. No growth occurred in any of the MMS mixtures or the LHS control. I conditionally accepted my hypothesis that the addition of organic compost would encourage the most growth in a lunar regolith and a Martian regolith. Based on the data and results of this experiment, the addition of either potting soil or organic compost increased the plant growth viability of the LHS lunar simulant.

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