Space Botanist: Effects of Fertilizer on Tomatoes Grown Upside Down in 75% Regolith

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This experiment displayed the effect of fertilizer and high amounts of regolith in an upside down plant's soil. Regolith has high amounts of minerals such as iron oxide, aluminum oxide, calcium oxide, etc. and is used to simulate Martian soil conditions. The fertilizers have varying amounts of minerals the plants need to augment and accelerate growth including nitrogen, potash and phosphate. The experiment tested plants with three different types of fertilizer: Watering Can Singles, Liquid All Purpose Plant Food, Osmocote Smart Release Plant Food and a control set up with an unfertilized regolith soil mix. Data from the 2016-2017 experiment suggested growing all plants upside down and data from the 2017-2018 experiment suggested growing the plants in 75% regolith soil to best simulate martian soil conditions. A structure was assembled allowing all the plants to be placed under these initial similar stresses. The amount of water provided daily ranged from 470-950 milliliters depending on weather conditions. The two different fertilizers were applied every ten days, while the Osmocote was applied once when planted. Data measurements were taken everyday of the height of each plant from box to tip. Additionally, the development of the fruit and length of the plants were observed and documented with photography. The plants with the added nutrients from fertilizer thrived. The experiment illustrated that even with the stressful conditions, the plants in total produced ten times more tomatoes than 2017.

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