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FARMING OF SOIL BACTERIUM ON MARS REGOLITH TO CULTIVATE NUTRIENTS FOR  
FERTILIZER, FEEDSTOCK, AND HUMAN CONSUMPTION

**Abstract**

We are currently in a new space age, with hopes of crewed space missions to mars and the habitability of these planets in the near future (Warner, C, 2022). The biggest issue with food on crewed space missions is ensuring that the astronauts have enough to eat and fulfill the nutrient requirement (O'Callaghan, J.,2020). Transporting enough food for more extended missions is a physical and economic problem needing more space and fuel (Guzman G. et.al, 2019) The solution to this could be growing the food in situ. There have been some successful germination experiments with tomato, wheat, cress, radish, rye, quinoa, chives, pea, and leek on regolith simulants (Gilrain, M.R. et al. ,1999 Wamelink, G.W.W. et al., 2014 ). However, these were achieved by using liquid nutrients or compost Constant transport of fertilizers to space isn't sustainable with how much time, money, and energy it costs to launch these and ship them to mars (Guzman G. et.al, 2019). Therefore, we want to look into genetically modifying bacteria that can survive and produce the necessary nutrition for human survival in terms of feedstock, plant fertilization, and human consumption.