The Fertilizer Friends

Daniel Horowitz, Melissa Quintana, Miles Scherer, Ilana Smith, Mateo Tuda, and Caleb Young





Effects of Varying Fertilizer Applications On The Growth of GBE Specimen 111, Wasabina Mustard (Brassica juncea)





Plant date: 02/22/2021 Germination date: 02/26/2021



Harvest Date: 03/18/2021

- As scientists continue to make advances in long-term space exploration, finding a cost effective way to grow quality, nutrient rich food in space has become an important obstacle to overcome.
- According to nasa.gov, it costs \$10,000 to send one pound of payload into Earth's orbit. NASA's goal is to reduce the cost of getting to space from hundreds of dollars per pound within 25 years to tens of dollars per pound within 40 years.

Hypothesis

If GBE 111, Wasabina Mustard Greens, are given 5 grams of fertilizer as opposed to 10 grams, then will they produce a similar or greater yield of edible biomass?



Introduction

Materials and Methods

Allison Academy Science adhered to the research protocols provided by the Fairchild Challenge team and the Kennedy Space Center.
Measurements were taken in
Centimeters using multiple rulers at a time
Plants watered with beakers (500 mL)
Biomass measured on analytical balance

Set Up





Weekly Measurements

Daily Analysis





Biomass Collection (Harvest Day)

Results

Total and Edible Fresh Bio Mass (in grams)



- Based on the data, Wasabina Mustard (Brassica juncea) produced an equivalent or greater biomass when given 5 grams of fertilizer as opposed to 10 grams.
- Reduction in fertilizer mass could lower the cost of payload for missions to and from the ISS, the upcoming Artemis mission, and eventually the mission to Mars.
- Conservation of resources on long term space missions where resources are finite.
- Based on our research and data, Wasabina Mustard seems well suited for space cultivation.
 - cut and come again
 - withstood lack of water/ temp. fluctuations
 - high vitamin C content
 - bold flavor
 - kid tested, mother approved



Discussion and Conclusion

Resources/Citations

Sharma, Vinod K, and Rana P Singh. "Organic Matrix Based Slow Release Fertilizer Enhances Plant Growth, Nitrate Assimilation, and Seed Yield of Indian Mustard (Brassica Juncea)." National Center for Biotechnology Information, U.S. National Library of Medicine, pubmed.ncbi.nlm.nih.gov/.

Smith, Richard, et al. "Evaluation of N Uptake and Water Use of Leafy Greens Grown in High-Density Bed Plantings and Demonstration of Best Management Practice." California Department of Food and Agriculture, www.cdfa.ca.gov/.

Drachilis, Dave. Advanced Space Transportation Program: Paving the Highway to Space. www.nasa.gov/centers/marshall/news/background/facts/astp.html.

Smith, Scott M, et al. "Space Nutrition." NASA, Trafford Rev., 2012, www.nasa.gov/.