Pueblo Chile Seeds and the Effects of Exposure to Radiation in the Stratosphere
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Abstract
This project is an attempt to grow Pueblo chile seeds postexposure to the varying stratospheric conditions, including radiation, temperature, and pressure. The hypothesis was to see if the plants germination/growth rate and two production would increase after potential genetic alterations occurred. The proof of concept was successful as the germination rate in our experimental samples increased versus the controls.

Not all controls grew; this can be contributed to conditions such as in but not limited to soil composition (nutrients and firmness), depth which seeds ended up at post planting (Light exposure), room temperature, and water supply.

Materials
We used the standard materials to make a box for our payload. After that, we created our greenhouse in the Stem Center. Which consisted of a long plywood boards separated in half and holes drilled into it and a drainage system. The seeds were planted in soil and placed in individual PVC pipe sections.

Testing Environment
Setting up the Testing environment in a spare room at Pueblo Community College, using a broad spectrum lighting system, as well as a controlled building a controllable environment, limiting the various variables encountered throughout the growth period of the chili plants.

After researching a viable broad-spectrum LED light to simulate natural sunlight, the team build a semi-enclosed area to place and control the plant and using a garden timer connected to the lights to simulate a natural day-night cycle. Placing fans above the potted plants to solve the problem of natural airflow was achieved, as well as keeping soil water saturation consistent between watering periods (using 50 mLs of water for each pot).

Results
During the entire experiment, there was substantial growth in the pots. Using a basic DemoSat Board, with integrated temperature, and moisture sensors, the team was able to track daily the various levels on both the control and experimental side of the testing environment. Due to early-on issues with airflow, some pots on both sides developed algae, forcing some plants to compete over valuable nutrients that is found in the soil, provided by DiTomasso farms.

Finding the experimental side had more substantial growth, proving prior hypothesis that exposure to a near space environment does change the germination rate of the tested Pueblo Chili Seeds. The second half of the original hypothesis, that exposed seeds yield fruit, has yet to be tested.

Conclusion
In conclusion, it is our belief that although more testing may need to be done, the experimental seeds that were exposed to the stratosphere radiation had grown more seedlings than the control seeds.

When we replicate this experiment in the future, we will have been more experienced on the matter as far as our scientific methods and we have a stronger vision for the entire process and look forward to any new challenges that come our way.

Recommendations
Recommendations or considerations going forward would include frequency of growth tracking, watering, soil testing, when to transplant in two larger containers.

At this time, we are fortunately prepared to handle most tasks up to this point next time we launch this experiment.

Acknowledgements