How Magnetic Fields Aid in the Adaptation of Plants to Microgravity Environments in Space

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This experiment aimed to study the effect of different gravity environments on seed growth using a Clinostat with varying degrees of rotation. The results showed that the gravity environment had a significant impact on the growth of the seeds, with each seed exhibiting different growth patterns. The seeds that germinated in standard gravity on Earth without any rotation had more sprouts, grew faster, and had long roots that stretched downwards. However, the seeds in reduced gravity had the longest roots, which mainly grew from right to left, but they took longer to germinate. On the other hand, the seeds that grew in microgravity were the most unique. They took longer to sprout, had shorter roots, less germination, and grew out in different directions like a firework, mainly because the statoliths were pulled in different directions. To counteract these negative effects, the seeds were exposed to a magnetic field with a toroid coil. The magnetic field used a neodymium magnet and a copper wire, and the electrical output was checked with a multimeter. Once the magnetic field was set up, the petri dishes were placed in the magnet's center for five days. The seedlings were then compared before and after growing in the microgravity with the magnetic field, and the results showed improved growth, length, health, and sprout total. Overall, plant growth can be improved in microgravity and other gravitational environments, benefiting space agriculture. This could lead to self-sustaining ecosystems in space and provide food for astronauts on long missions.