Challenges of Life Support - Medical Support for Manned Space Exploration (9)
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EFFECTS OF SPACEFLIGHT AND SIMULATED MICROGRAVITY ON CELL
SUB-MICROSTRUCTURE AND ANTIOXIDANT ENZYME ACTIVITY IN TOMATO

**Abstract**

Controlled ecological life support systems provide food, air, water, and other basic living resources for crew members on long-duration spaceflight missions. Plants are an important basic requirement of these systems and their biological characteristics in space have very high research value. In order to verity whether higher plants can complete the development process of flowering and bearing fruits in space and better understand how microgravity affect plant reproduction, experiments on flowering and bearing fruits of tomato plantlets in space and simulated microgravity environments were carried out in this study. The experiments were completed by the spaceflight of Shenzhou 8 spacecraft and the clinorotation on the three dimensional(3-D) clinostat. Results showed that Tomato plantlets could flower and born fruits in both space and simulated microgravity environments. Compared to the ground control, no differences on the plant height, the percentage of fruit bearing and the size of fruits were found. Leaf cell sub-microstructure of the tomato samples experiencing spaceflight had more changes than that of the samples processed by simulated microgravity effects, and both peroxidase (POD) and superoxide dismutase (SOD) activities increase obviously in both the environments.