

Challenges of Life Support - Medical Support for Manned Space Exploration (9)  
Challenges of Life Support - Medical Support for Manned Space Exploration (1)

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## PLANT SPACE MUTATION AND APPLICATION IN SPACE BREEDING

### Abstract

Compared to the plant growing conditions on Earth, a totally unusual space environment, such as high-energy ion radiation, microgravity, space magnetic field, ultra vacuum, may have either direct or indirect effects on plant growth and metabolic activities. Plants in space must response those different conditions in order to complete a full life cycle. Genetic mutagenesis of seeds or seedlings may thus take place when being flown with retrievable satellites and spacecrafts. This opens potential opportunities for screening new plant varieties by ground-based observation and selection. This paper summaries recent progress in earth-grown plants returned from China's retrievable satellites and spacecrafts to study on space mutation mechanism, including effects of space condition on plant DNA polymorphic changes, on leaf cell sub-microstructure and antioxidant enzyme activity, plant gene expression change, DNA damage in plants, the miRNA expression in plant. We screened new crop floricultural, and vegetable varieties. Of them, some promising new varieties have been successfully planted in large scales. Space mutations lead to a great potential approach in screening diverse valuable plants in the future.