

Life Sciences as Related to Space (F)
Innovative Approaches to Space Agriculture (F4.7)

PROPOSAL OF A SIMPLE PLANT GROWTH SYSTEM UNDER MICROGRAVITY CONDITIONS IN SPACE

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Plant culture in space has multiple functions for human life support such as providing food and purifying air and water. It is also suggested that crew can relieve their stress by watching growing plants and by enjoying fresh vegetable food during staying for several months in the International Space Station. Under such circumstances, it is an utmost importance to develop plant culture equipment that can be handled more easily by crew. This study aims to develop an easy-to-use plant growth system with modification of commercial household plant culture equipment. The item is equipped with a peltier device for cooling air and collecting water vapor in the growth room. The study was conducted to examine the performance of the equipment under microgravity conditions that were created by the parabolic airplane flights. As a result, the temperature of the peltier device was affected under the microgravity conditions due to the absence of heat convection. When an air flow was made with an air circulation fan, the temperature of the peltier device was stable to gravity changes. The water recycling method for an automatic nutrient solution supply system in the closed plant culture equipment under microgravity is proposed. In addition, a high output white LEDs showing a good performance for growing leafy vegetables will be introduced.