Paper ID: 55021
student

52nd IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (D5)
Interactive Presentations - 52nd IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (IP)

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TOXIC AIR REMOVAL USING AN INDOOR HOUSEPLANT IN THE CORE MODULE OF INFLATABLE LUNAR MARTIAN ANALOG HABITAT AT THE UNIVERSITY OF NORTH DAKOTA

Abstract

International Space Station is a typical example for a closed environment. At the University of North Dakota, an Inflatable Lunar Martian Analog Habitat consisting of five different modules is setup. A mission of three crew members stay inside the closed environment for up to 2 weeks conducting different experiments. Indoor houseplants play a vital role in any closed environments such as home, workplace etc. Sansevieria trifasciata, commonly called as Snake plant or Mother-in-law's Tongue is an ideal plant for indoor space because of its natural ability to purify air. An interesting research program has been done by NASA using a few selected plants including the Snake plant for air purification and to curb "Sick Building Syndrome". The results have consistently shown in that the plant removes toxins such as trichloroethylene, formaldehyde, benzene, and xylene. The plant purifies the air by absorbing toxins through the leaves and produce adequate oxygen during night thereby also promoting the sleep factor in the human body. This paper discusses how indoor houseplants can be effective in producing good air quality in the surroundings. Three 6 inch snake plants are kept in the living core module where the crew members live and sleep. A TVOC (Total Volatile Organic Compound) sensor is placed near the plant which is monitored during pre and post-mission to collect data of the toxic gases obtained. The experiment would be divided in three different phases; calibration phase, plants with the sensor, humans with the plants and sensor. These data will be crucial to analyze the number of toxic substances present in the module and thereby serving as a preliminary study in the quality of sleep experienced by the crew members with the plant present during the mission.