COLLEGE OF ENGINEERING
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

Research Horizons Day
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The effect of Golden Pothos in reducing the level of volatile organic compounds in a simulated spacecraft cabin

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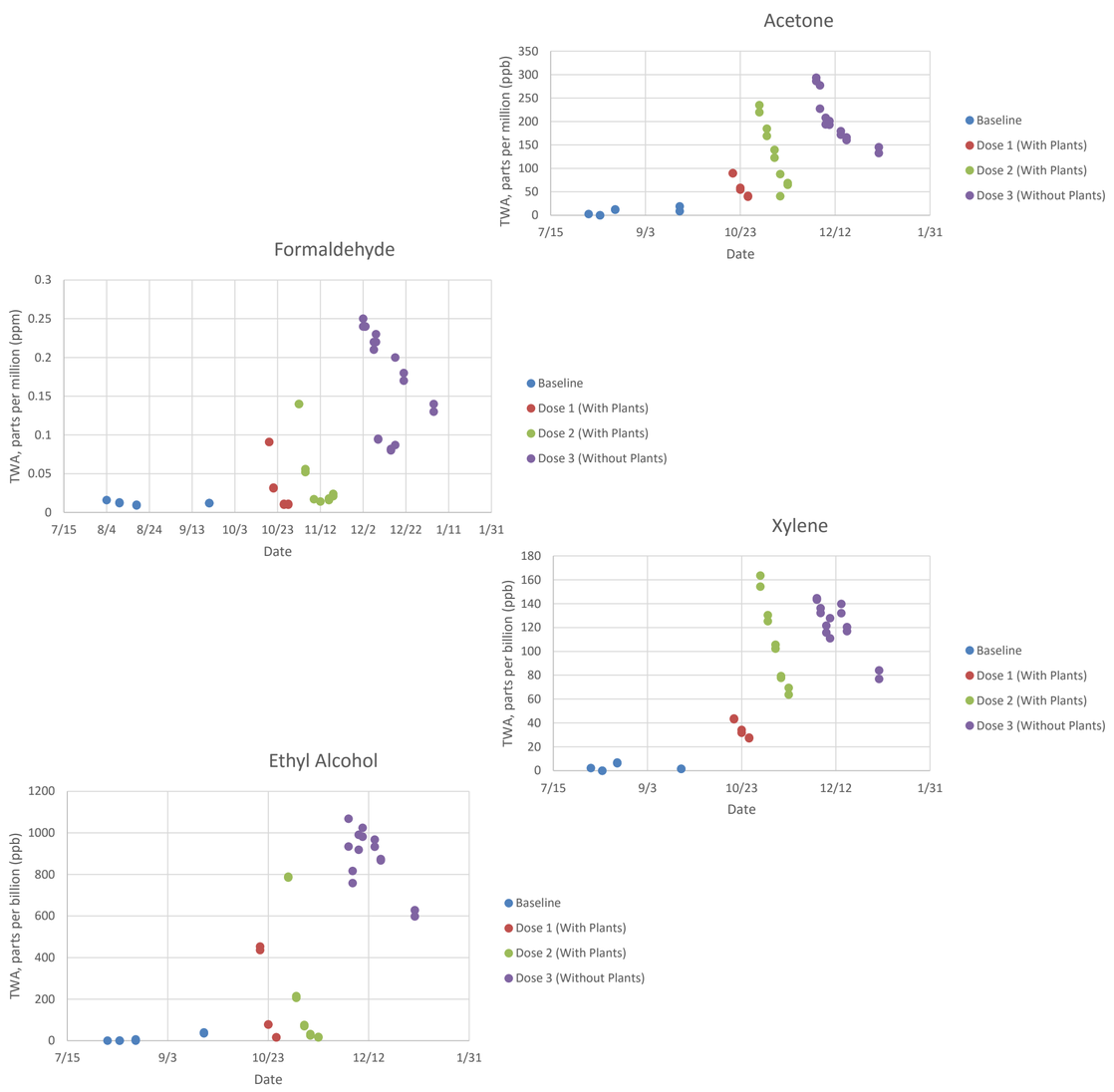
Overview

- The impact of Golden Pothos on indoor air quality was studied against a simulated spacecraft trace contaminant load model, consistent with the International Space Station (ISS), containing volatile organic compounds (VOCs) and formaldehyde.
- Previous research provides inconclusive results on the efficacy of plant VOC removal which this projects seeks to rectify through a better experimental design.
- This work develops a passive system for removing common VOC's from spacecraft and household indoor air and decreasing the necessity for active cabin trace contaminant removal systems.

Experimental Methodology

- Commercial passive air monitoring badges & gas-phase Fourier transform infrared spectroscopy (FTIR) were used to measure indoor air quality in the chamber with Golden Pothos and with an empty chamber, as a baseline.
- Temperature and relative humidity were monitored and adjusted using a dehumidifier. Plant watering was maintained using a controlled drip system.
- Day/night was simulated with a light timer.

Key Findings



Chemical	Time to Reach Baseline with Plants	Time to Reach Baseline without Plants
Formaldehyde	5.6 Days	60.5 Days
Ethyl Alcohol	9.25 Days	102.5 Days
Acetone	13.8 Days	55.4 Days
Methylene Chloride	38.3 Days	77.9 Days
Xylene	22.5 Days	86.3 Days

Impact

- Air monitoring badges showed that controlled VOCs and formaldehyde injections were removed from the air and reached baseline levels at a significantly faster rate for all of the harmful compounds tested when Golden Pothos was present in the chamber.
- FTIR found that: 1) H_2O levels were higher with Golden Pothos in the chamber, necessitating higher dehumidifier usage and 2) CO_2 levels continuously increased (with exception of at night) indicating higher respiration than photosynthesis.

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