

SENSITIVITY OF RADISH TO VOLATILE ORGANIC COMPOUNDS:  
TOLUENE, ETHANOL, AND ACETONE

G.W. Stutte<sup>1\*</sup>, I. Eraso<sup>1</sup>, S. Anderson<sup>1</sup>, and O. Van Den Ende<sup>2</sup>

<sup>1</sup>Dynamac Corporation, Mail Code DYN-3, Kennedy Space Center, FL

<sup>2</sup>Bionetics Corporation, Mail Code BIO-3, Kennedy Space Center, FL

Manned spacecraft are designed to have extremely low leak rates which may contribute to the accumulation of anthropogenic (solvents, hygiene products, machinery) and biogenic (plant, animal, microbial) Volatile Organic Compounds (VOC's) in the atmosphere. NASA's Spacecraft Maximum Allowable Concentrations (SMAC's) establish astronaut exposure limits for VOC's, however the biogenic activity of those levels to plants systems has not been determined. The validity of the SMAC's to plant production systems was tested by exposing radish (*Raphanus sativus* L. cv. Sora, Cherry Belle and Cherry Bomb) to three common spacecraft VOC's (acetone, ethanol, and toluene) at the SMAC, 0.1 SMAC and control concentrations. The radishes were grown in controlled environment chambers at 23°C, 75% RH with 1,500  $\mu\text{mol mol}^{-1} \text{CO}_2$ . A 16 h light/ 8 h dark photoperiod under cool white fluorescent lamps at 300  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PPF was provided. Phytotoxic responses to ethanol and toluene, but not acetone, were observed at the 0.1 SMAC concentrations. This suggests that additional research on biogenic effects of VOC's in plant systems is required.