# Removal of toluene in an intramural environment using *Sansevieria trifasciata*

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Volatile Organic Compounds (VOCs) are a group of chemicals that can be emitted as gasses into indoor air at room temperature. Benzene, toluene, ethylbenzene, and xylene are the most common hazardous VOCs that persist in indoor air. *Sansevieria trifasciata* is a common and hardy ornamental plant that survives indoors for long periods. An experimental model was used to study its removal capabilities of indoor air VOCs under ambient conditions using toluene as the pollutant. Three independent experiments were conducted using two airtight glass chambers (1 $m^3$), one as a test chamber and one as the control. The test chamber consisted of

a healthy plant (3 replicates, 1191.41 ± 45.99 $cm^2$). An overhead light box with five 18 W fluorescent tubes was used to provide constant light. A thermohygrometer was placed in the chamber to measure the temperature and humidity in the chamber. The chambers were completely sealed to minimize leakages. Toluene (220 µL) was introduced to the sealed chamber through the injecting port. After 2 hours of equilibration, air samples (10.0 mL) were collected using a gas-tight syringe and manually desorbed into carbon disulfide (2 mL). Samples were analyzed using Gas Chromatography-Mass Spectrometry (GC-MS). The concentration of toluene in the chamber was determined for three consecutive days within 24-hour time intervals. Toluene reduction was observed compared to the control chamber. Three independent experiments revealed that the plant's toluene removal was 20.13 ± 3.20, 21.52 ± 0.90, 37.67 ± 5.20 $\mu g.m^{-3}cm^{-2}$ respectively on the 1st, 2nd, 3rd day. Its toluene removal efficiency was 0.80 ± 0.06 $\mu g. m^{-3}. h^{-1}. cm^{-2}$ under ambient conditions. The results indicate that *S. trifasciata* is a good botanical purifier of toluene in indoor air. Indoor plants not only beautify indoor environments but also remove VOCs from air.

**Keywords:** Toluene, indoor air quality, *S. trifasciata*.