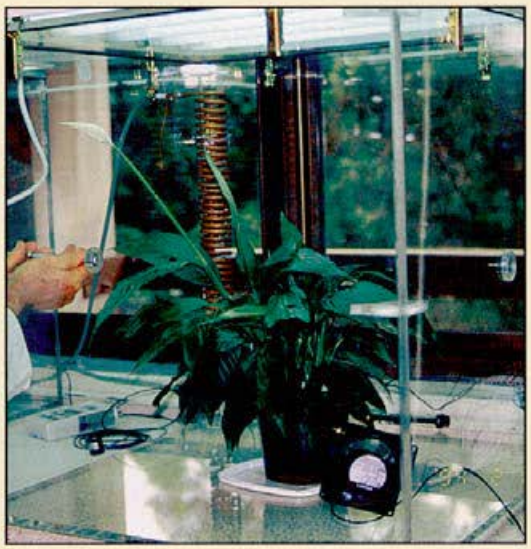
Can plants *purify* indoor air?

Photosynthesizing plants purify and revitalize the Earth's atmosphere, so why not presume the same phenomenon occurs in the indoor environment?

Plant leaves can absorb chemicals from the environment, translocate and biodegrade them. Studies of how plants use these abilities to respond to stress caused by air pollutants have led to an 'air pollution tolerance index' being proposed for trees growing in urban areas. There has been scant reserch, however, on the stress responses of indoor plants to air pollution.

Dr Bill Wolverton of the National Aeronautics and Space Administration (NASA) has used sealed test chambers to demonstrate the ability of indoor foliage plants to reduce the concentrations of various trace organic chemicals such as formaldehyde, benzene and trichloroethane.



Scientists at the University of Technology, Sydney, are testing the stress responses of plants under various conditions. The information will be used as the basis for quantifying the plants' capacity for reducing indoor pollution. This will enable plants to be selectively bred for specific indoor environments.

In studies that are complementary to CSIRO's air-quality program, researchers at the University of Technology, Sydney, are working to develop a stress (pollution) tolerance index for selected indoor plant varieties. Associate Professor Margaret Burchett and Ronald Wood are testing the stress responses of selected plants under a variety of conditions via measurements of four physico-chemical parameters.

Initial investigations are evaluating the role of ascorbic acid, chlorophyll, relative water content and leaf-extract pH, in plant responses to pollutants. Combining these parameters together into a formulation, may make possible an 'air pollution tolerance index' of plants. This part of the study aims to establish information on plants not subjected to pollutants as the basis for investigating the responses of plants exposed to air pollutants in typical building environments.

Eight species of foliage plants are being studied. They are *Spathiphyllum* 'Petite', *Philodendron* 'Xanadu', *Howea forsteriana, Aglaonema* 'Silver Queen', *Ficus benjamina* 'Shorty', *Homolomena* 'Emerald Gem', *Syngonium* 'Tiffany' *and Ficus benjamina* 'Wintergreen'.

During the course of evolution, the higher plants have developed an efficient defence system that enables them to survive under environmentally adverse conditions. Plant cells are equiped with protective enzymes and vitamins such as vitamin A, vitamin E and vitamin C. Ascorbic acid, (vitamin C) is a ubiquitous constituent of green plants, activating many physiol-ogical and defence mechanisms against environmental stress. Vitamin C, of course, also helps to protect us from the effects of colds and 'flu. There is also recent evidence of a protective enzyme in plant tissues which is biochem-ically identical to an enzyme in white blood cells, whose function is related to the body's defence against invading bacteria and other foreign substances. This raises the possibility that plants and people share a common defence response to invading molecules.

In a parallel study, four perspex test chambers have been constructed to test the ability of indoor foliage plants to reduce levels of formaldehyde, the most widespread of indoor volatile organic pollutants. These controlled conditions will enable investigation of the efficiency of different plants in absorbing formaldehyde, as a model for other volatile organic compounds.

Quantification of the plants' capacity for pollution reduction will lead to future selection and breeding of more efficient varieties. This will enable specific plant varieties to be chosen for individual indoor environments. The commercial potential of such specifications is enormous, for both domestic and overseas markets.

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