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AIR, EARTH AND WATER

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INDOOR POLLUTION

PLANTING THE SEEDS OF HEALTH

After nearly two decades of tests, NASA has unveiled the first widely available weapon in the war against indoor air pollution: the ordinary house plant. Several common varieties have been shown to gobble up a wide range of contaminants, from benzene in tobacco smoke to formaldehyde in household cleaners.

NASA's interest in the plants grew out of efforts to develop biological life-support systems in enclosed space habitats. But the results could be just as important for our long-term survival here on Earth—particularly since the EPA has found that the concentration of some contaminants in homes and office buildings exceeds outside levels by 200 to 500 percent.

Common sources of pollutants are adhesives, carpeting, vinyl or rubber molding, pressed wood, copying machines, cooking gas, cleaning agents and pesticides. People affected by the chemicals they contain frequently complain of headaches, irritated eyes, drowsiness, skin rashes, difficulty breathing and a host of other allergy-related conditions. Worse, these acute symptoms—referred to as "sick building syndrome"—may be followed years later by more severe health consequences. Formaldehyde, benzene and trichloroethylene—three of the most common indoor pollutants—are known or strongly suspected to cause a variety of cancers. According to a recent government report, indoor contaminants cost the nation tens of billions of dollars per year in lost productivity and medical bills.

As far back as 1973, NASA found the air inside Sky Lab 3 was contaminated with over 100 chemicals. William Wolverton, Ph.D., an environmental engineer, was called in to solve the problem. Since plants recycle oxygen, he reasoned, they might have a hidden talent for breaking down pollutants as well. Wolverton began exposing plants to high concentrations of different chemicals inside sealed chambers. Within 24 hours, aloe vera

THREE TOP POLLUTION RISKS AND THE PLANTS THAT CONQUER THEM

POLLUTANT	SOURCES	HEALTH RISKS	SOLUTIONS
Formaldehyde	Foam insulation Plywood Clothes Carpeting Furniture Paper goods Household cleaners	Headaches Irritation of eyes and/or upper-respiratory tract Asthma (w/prolonged exposure) Throat cancer (rare)	Philodendron Spider plant Golden pothos Corn plant Chrysanthemum Mother-in-law's tongue
Benzene	Tobacco smoke Gasoline Synthetic fibers Plastics Inks Oils Detergents Rubber	Irritation of skin and eyes Headaches Loss of appetite Drowsiness Leukemia and other blood diseases	English ivy Marginata Janet Craig Chrysanthemum Gerbera daisy Warneckei Peace lily
Trichloroethylene	Dry cleaning Inks/paints Varnishes Lacquers Adhesives	Cancer of the liver	Gerbera daisy Chrysanthemum Peace lily Warneckei Marginata

removed 90 percent of the formaldehyde in its chamber; marginata reduced benzene concentrations by almost 80 percent; and peace lily cut trichloroethylene by 50 percent.

According to Wolverton, now an industry consultant, chemicals are absorbed into the plants through tiny pores on the underside of the leaves. Also, bacteria associated with the roots help break down contaminants, which are then taken up by the roots as nutrients. Since no one plant can tackle all pollutants, Wolverton suggests cultivating a mix of plants that excel at breaking down different classes of compounds (see chart). One or two plants per 100 square feet is usually sufficient, though severe problems may require air venting or removing pollutant sources as well.

To maximize antipollution capabilities, Wolverton developed a "filter planter"—basically a high-tech flower pot. The container holds a hydroponic growth medium—carbon and porous clay pebbles—that he says traps pollutants more effectively than soil. A fan concealed at the base of the container draws 50 cubic feet of air per minute down through the medium into the microbe-rich root system. Alliance Research and Manufacturing Corporation of Taylorsville, Mississippi, is marketing the filter planter to interior decorators and florist suppliers, and plans to make it more widely available by the end of the year for a retail price of about $125 (plant included).

NASA and EPA officials are also interested in the filter planter for its potential to rid homes of radon (see Secret Fears, *page 86*). In theory, the carbon in the filter should adsorb the short-lived radon, allowing it to break down into radioactive lead that is then absorbed by the roots. "The idea," says Wolverton, "is to trap the radioactivity in the plant, rather than in your lungs." The planter is now being investigated for NASA by the Department of Energy. Only further testing will tell if the scheme has merit, but as a recent NASA report says: "If man is to move into closed environments . . . or in space, he must take along nature's life-support system."