Indoor Plants Effective in Reducing Airborne Particulates, Removing Pollution and Improving Air Quality

Low-light requiring houseplants have demonstrated the potential for improving indoor air quality by removing trace organic pollutants from the air in buildings. This plant system is one of the most promising means of alleviating the sick building syndrome associated with many new, energy-efficient buildings. The plant root-soil zone appears to be the most effective area for removing volatile organic chemicals. Therefore, maximizing air exposure to the plant root-soil area should be considered when placing plants in buildings for best air filtration.

- **Interior Landscape Plants for Indoor Air Pollution Abatement Final Report**
by NASA, John C. Stennis Space Center --B.C. Wolverton, Ph.D., Principal Investigator, Anne Johnson, M.S. and Keith Bounds, M.S. Sept. 1989.

Experiments have documented that the accumulation of particulate matter on horizontal surfaces in interiors can be reduced by as much as 20% by adding foliage plants (good news for the housekeeping staff!).

Particulate Matter Accumulation on Horizontal Surfaces in Interiors: Influence of Foliage Plants
published by *Atmospheric Environment*, by Virginia I. Lohr and Caroline H. Pearson-Mims. 1996, Vol. 30, No. 14,

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For plants to be an effective tool in providing good indoor air quality, architects must design with plants in mind, not as an afterthought after the building is completed. There are now products available to significantly enhance the air purifying capacity of plants. In new buildings, the air can be circulated through plant filled atriums before distribution throughout the building. In existing facilities, portable devices make it possible for individuals to use plants to provide clean air

in their "personal breathing zones" in office cubicles or living areas. Man's mechanical ingenuity, in harmony with nature, can ensure a healthy environment for the 21st century.

Indoor Air Pollution - A Sixty Billion Dollar Per Year United States Health Problem. Can Houseplants Be Part of a Cost-Effective Solution? Published by Plants for Clean Air Council.

Plants and associated soil microflora can be used as effective air filters which remove and absorb toxic VOC's from indoor air [16]. It is possible to improve indoor air quality by using a specially screened plant combination which efficiently removes toxic compounds from ambient air.

Plants can provide an effective way of decreasing mycotoxins concentration in indoor air by destroying bacteria and fungi. Begonia and geranium were shown to decrease air microorganism content by 43%, small flowerish chrysanthemum - by 66% [17]. In rooms where flower pots with lemons, orange-trees, tangerine-trees are located the air is almost sterile [18]. Myrtle vulgaris - evergreen indoor plant has antibacterial action [19]. It was shown [20] that volatile oils of thyme, mint, marsh tea, wormwood have fungi-static actions.

It was shown that improvement of IAQ just to the outdoor level will decrease the sick absenteeism at least by 30% [38] and reduce the frequency of complaints (headache, lethargy, fatigue) up to 400% and therefore increase the productivity [5,6,23,39].

Dr. N. Salansky Review,
Appendix 1, On Health Benefits of B.A.R.S

Studies by the National Aeronautics and Space Administration (NASA) prove that plants not only beautify indoor environments, they make them healthier to live in. NASA studied the benefits of plants for use in future space stations and closed environments. Properly designed indoor planting can provide an inexpensive, refreshingly low-tech means of removing pollutants from the air in offices and homes. Virtually every tropical indoor plant and many flowering plants are powerful removers of indoor air pollutants.

Below is a chart of the plants in the NASA study that most effectively removed pollutants from the air.

Pollutant	***Source***	***Solutions***
Formaldehyde	foam insulation plywood particle board clothes carpeting furniture paper goods household cleaners water repellants	Azalea Dieffenbachia Philodendron Spider plant Golden pothos Bamboo palm Corn plant Chrysanthemum Mother-in-law's tongue Poinsettia
Benzene	tobacco smoke gasoline synthetic fibers plastics inks oils detergents	English ivy Marginata Janet Craig Chrysanthemum Gerbera daisy Warneckei Peace lily
Trichloroethylene	dry cleaning inks paints varnishes lacquers adhesives	Gerbera daisy Chrysanthemum Peace lily Warneckei Marginata