

Indoor plants for health and wellness

Indoors, plants are busy cleaning the air we breathe and absorbing chemicals emitted from building materials, carpets and furniture. They can dampen traffic noise, absorb carbon dioxide and increase home values by as much as 15%!

The psychological benefits of plants have been recognized for many years yet it is only recently that studies have quantified these benefits. These studies show that stress reductions and increased performance of college students and office workers by up to 12% are achieved from the installation of interior landscapes. Plants have also been shown to increase feelings of wellness and speed up the recovery of hospital patients.

Other studies attribute unusually high occupancy rates at hotels to gardens and plants, further supporting the fact that landscapes enhance relaxation and help reduce stress!

The majority of the research examining plants as natural air cleaners comes from Dr. Bill Wolverton and fellow scientists at NASA's Stennis Space Center in the early 1990s. NASA has been concerned about the long-term environmental health consequences of off-gassing from the hundreds of chemical compounds found on shuttles and space stations. A two-year study was conducted which involved Plexiglas chambers containing a variety of plants into which different pollutants were introduced and measured.

Amazingly, plants like aloe vera, philodendron, snake plant (*Sansevieria*), and golden pothos removed up to 90 percent of the formaldehyde injected into the chamber. *Dracaena*, peace lily (*Spathiphyllum*), English ivy, and gerbera daisy helped remove up to 80 percent of the benzene in their closed system. Many of these same plants also reduced TCE levels by nearly 50 percent. In fact, numerous plants were effective at removing a broad range of the most dangerous compounds and other indoor air pollutants such as carbon monoxide and benzene which are major contributors to Sick Building Syndrome and global warming.

Moreover, while the many thousands of stomata or "pores" on each plant leaf handled much of the filtration process, further research revealed that even roots and bacteria in the plant's soil helped absorb some of the toxic substances. It is also believed that over time, plants and soil microorganisms may in fact adapt themselves to absorb even more and different contaminants, turning to them as a source of nutrient, much like nitrogen and carbon dioxide.

According to NASA researchers, just 15 plants can help clean the air of the average 1,800 ft² home or the addition of one medium-sized indoor plant per 100ft² of home or office space.



25 top plants

These plants have been shown to be effective in removing common pollutants from indoor air including formaldehyde, benzene and carbon monoxide.

Common Name	Scientific Name
Anthurium	Anthurium andraeanum
Areca palm	Chrysalidocarpus lutescens
Benjamin Weeping Fig	Ficus benjamina
Boston fern	Nephrolepis exaltata
Chinese Evergreen	Aglaonema modestum
Corn Plant	Dracaena massangeana
Croton	Codiaeum variegatum
Date palm	Phoenix roebelenii
Dieffenbachia	Dieffenbachia bowmannii
English Ivy	Hedera helix
Fig 'Alii'	Ficus macleilandii 'Alii'
Gerbera Daisy	Gerbera jamesonii
Golden pothos	Epipremnum aureum
Janet Craig	Dracaena "Janet Craig"
Marginata	Dracaena marginata
Norfolk Island Pine	Araucaria Hetrophylla
Peace Lily	Spathiphyllum "Mauna Loa"
Potted Mum	Chrysanthemum morifolium
Ponytail palm	Beaucarnea recurvata
Prayer plant (Calathea)	Maranta leuconeura erythroneura
Rubber plant	Ficus elastica
Snake plant	Sansevieria laurentii
Warneckii	Dracaena "Warneckii"
Zebra plant	Aphelandra squarrosa
ZZ plant	Zamioculcas

The chemicals used and their sources as common indoor pollutants

Trichloroethylene (TCE) is a commercial product found in a wide variety of industrial uses. Over 90 percent of the TCE produced is used in the metal degreasing and dry cleaning industries. In addition, it is used in printing inks, paints, lacquers, varnishes, and adhesives.

Benzene is a very commonly used solvent present in gasoline, inks, oils, paints, plastics and rubber. In addition, it is used in the manufacture of detergents, explosives, pharmaceuticals and dyes. Benzene irritates the skin and eyes and may also be a contributing factor in chromosomal aberrations and leukemia in humans. Repeated skin contact with benzene will cause drying, inflammation, blistering and dermatitis. Acute inhalation of high levels of benzene has been reported to cause dizziness, weakness, euphoria, headache, nausea, blurred vision, respiratory diseases, tremors, irregular heartbeat, liver and kidney



damage, paralysis and unconsciousness. Chronic exposure to even relatively low levels causes headaches, loss of appetite, drowsiness, nervousness, psychological disturbances and diseases of the blood system, including anemia and bone marrow diseases.

Formaldehyde is a ubiquitous chemical found in virtually all indoor environments. The major sources which have been reported and publicized include urea-formaldehyde foam insulation (UFFI) and particle board or pressed wood products used in office furniture. It is also widely used in consumer including grocery bags, waxed papers, facial tissues, paper towels, cleaning agents, water repellents, fire retardants and the adhesive binders in floor coverings, carpet backings and permanent-press clothes. Other sources of formaldehyde include heating and cooking fuels like natural gas, kerosene and cigarette smoke.

Formaldehyde irritates the mucous membranes of the eyes, nose and throat. It is also a highly reactive chemical which combines with protein and can cause allergic contact dermatitis. The most widely reported symptoms from exposure to high levels of this chemical include eye irritation and headaches. Long term exposure can lead to asthma.

