

INDOOR PLANT HIRE IMPROVES INDOOR AIR QUALITY

Introduction

People have worked indoors for many centuries, but it is only in the last few decades that the indoor environment is generally totally sealed, air conditioned, and filled with synthetic materials that can out gas chemicals into the air. These chemicals called VOCs, or volatile organic compounds, can have concentrations several times higher than that present in outdoor city air, and are recognized as having a deleterious effect on the health of people working in this environment.

Over the last twenty years it has become recognized that indoor plants have the ability to remove these VOCs from the indoor air, or at least substantially reduce their concentration.

This article outlines the health effect thought to be caused by these VOCs in indoor air, and looks at the research behind the removal of these compounds using indoor plants. As the most effective way to keep plants healthy in offices is indoor plant hire, it is suggested that indoor plant hire is the preferred option of maintaining plants in offices.



Air quality inside offices

The use of synthetic building materials, printers, computers, cleaners and personal care products, combined with the practice of air conditioning buildings, has resulted in the build up of chemicals called volatile organic compounds in buildings. Below are some building materials and the chemical they exude:

Adhesives, ceiling tiles, paints, printers	Benzene, Toluene, Ethyl Benzene and Xylene.
Photocopiers, particle board	Formaldehyde

It will be shown later in this article that the indoor plants used in indoor plant hire can remove the above chemicals.

Amongst other contaminants, over 300 VOCs have been found in office air (Weshler Shields 1996) as well as other toxic gasses such as nitrogen oxide and carbon monoxide (Ross 1996).

Frequently no single pollutant having toxic potential is present in unhealthy amounts, yet combined they form part of a chemical soup, which when combined with ozone can produce hydroxyl radicals (Weshler 1996).

In Australia the CSRIO can sample air within buildings and is able to measure a large range of potential pollutants.

Health effects of VOC exposure

Research in Europe and the U.S. shows that most people in cities spend 90% of their time indoors (Hodgson, Mann and Cavello 1997), and productivity losses of up to 6% have been shown in buildings where the indoor air quality is poor.

The Minnesota Department of Health in the U.S. lists the following health effects from VOC exposure:

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Acute

- Eye irritation / watering
- Nose irritation
- Throat irritation
- Headaches
- Nausea / Vomiting
- Dizziness
- Asthma exacerbation

Chronic

- Cancer
- Liver damage
- Kidney damage
- Central Nervous System damage

Most studies to date have been conducted on single chemicals. Less is know about the health effects of combined chemical exposure. The best health protection measure is to limit your exposure to products and materials that contain VOCs when possible. If you think you may be having health problems caused by VOC exposure consult an occupational/environmental health physician who specializes in this area “

The following link is to a Fact Sheet from the Australian Department of the Environment, which gives details on the VOCs indoors and their health effects.

<http://www.npi.gov.au/database/substance-info/profiles/pubs/tvoc-factsheet.pdf>

John Bergs in a study in the Netherlands found that health complaints by office workers have been on the increase since the seventies, and found that on average some 35% of office workers are dissatisfied with the interior environment and 20% suffer from health complaints such as eye complaints and nose and throat irritations. In the same study he showed the benefits that can accrue from having indoor plants in the office.

It is well to remember that indoor air could be found to be under the control of the employer and as such the employer may have responsibilities and potential liabilities.

Indoor Plant Hire Benefits

Over the last twenty years, it has been proven that healthy indoor plants, as used in indoor plant hire, have the ability to remove VOCs from the indoor air. Research has shown that the system in action is the biological interaction between the plant roots and the potting mix, enhancing micro organisms present to “eat up” the VOCs. Further more; their appetite seems to increase with increased exposure to VOCs.

As early as 1980, Dr. Wolverton working for the NASA space program discovered that indoor plants could remove VOCs from sealed test chambers. This was part of a NASA study into clean air inside closed life support systems.

In 1990 Dr. Wolverton in association with the Plants for Clean Air Council in the U.S. tested fifty indoor plants for their ability to remove various VOCs from sealed test chambers. These finding were published in Dr. Wolverton’s book “ECO friendly house plants”, published in 1996.

A lot of recent research on the subject has been carried out by Ronald Wood and Associate Professor Margaret Burchett from the U.T.S. in Sydney. Research in test chambers, progressed to experiments in real office situations in Sydney, and the results were published in their paper entitled “The potted plant microcosm substantially reduces indoor air VOC pollution: 1. Office field study” February 1996. Some of the conclusions were:

Where indoor TVOC load was above 100 parts per billion, indoor plants reduced the level by up to 70%

Reducing the number of plants per test location did not reduce the VOC levels removed, pointing to increased activity by the micro organisms.



Research in Europe (John Bergs and Tove Fjeld) and the United States (Virginia Lhor 1996) have shown that in offices with indoor plants (as compared to offices without plants) worker productivity increases of up to 12% have been measured, and on average health complaints related to sick building syndrome reduced by 20%.

The above results have all been produced with healthy indoor plants. Whilst in a home situation it is feasible to adequately maintain indoor plants, this requires a professional indoor plant hire service in an office situation, where other duties take priority. The

author has seen many offices where the staff “looked after” the plants. In ninety nine per cent of these situations the indoor plants were unsightly and as good as dead. This fact has been recognized by the Green Building Council in Australia where, in order to gain 2 points under their Green Star rating system a two year professional maintenance scheme needs to be in place.

About the Author

Rudy Ursem is the General Manager / Owner of Green Design Indoor Plant Hire in Sydney Australia. He has operated this business for more than 25 years. Prior to that Rudy obtained a Civil Engineering degree at the University of NSW.

Further information on the subject of this article can be obtained at <http://www.greendesign.com.au>