Top Houseplants for Improving Indoor Air Quality

In the late 1980s, a study by NASA and the Associated Landscape Contractors of America (ALCA) resulted in excellent news for homeowners and office workers everywhere. The study concluded that common houseplants such as bamboo palms and spider plants not only make indoor spaces more attractive, they also help to purify the air!

The study was conducted by Dr. B.C. Wolverton, Anne Johnson, and Keith Bounds in 1989. While it was originally intended to find ways to purify the air for extended stays in orbiting space stations, the study proved to have implications on Earth as well.

Newer homes and buildings, designed for energy efficiency, are often tightly sealed to avoid energy loss from heating and air conditioning systems. Moreover, synthetic building materials used in modern construction have been found to produce potential pollutants that remain trapped in these unventilated buildings.

The trapped pollutants result in what is often called the Sick Building Syndrome. With our ultra modern homes and offices that are virtually sealed off from the outside environment, this study is just as important now as when it was first published.

While it's a well known fact that plants convert carbon dioxide into oxygen through photosynthesis, the NASA/ALCA study showed that many houseplants also remove harmful elements such as trichloroethylene, benzene, and formaldehyde from the air.

NASA and ALCA spent two years testing **19 different common houseplants** for their ability to remove these common pollutants from the air. Of the 19 plants they studied, 17 are considered true houseplants, and two, gerbera daisies and chrysanthemums, are more commonly used indoors as seasonal decorations.

The advantage that houseplants have over other plants is that they are adapted to tropical areas where they grow beneath dense tropical canopies and must survive in areas of low light. These plants are thus ultra-efficient at capturing light, which also means that they must be very efficient in processing the gasses necessary for photosynthesis. Because of this fact, they have greater potential to absorb other gases, including potentially harmful ones.

In the study NASA and ALCA tested primarily for three chemicals: Formaldehyde, Benzene, and Trichloroethylene. Formaldehyde is used in many building materials including particle board and foam insulations. Additionally, many cleaning products contain this chemical. Benzene is a common solvent found in oils and paints. Trichloroethylene is used in paints, adhesives, inks, and varnishes.

While NASA found that some of the plants were better than others for absorbing these common pollutants, all of the plants had properties that were useful in improving overall indoor air quality.

NASA also noted that **some plants are better than others** in treating **certain chemicals**.

For example, English ivy, gerbera daisies, pot mums, peace lily, bamboo palm, and Mother-in-law's Tongue were found to be the best plants for treating air contaminated with Benzene. The peace lily, gerbera daisy, and bamboo palm were very effective in treating Trichloroethylene.

Additionally, NASA found that the bamboo palm, Mother-in-law's tongue, dracaena warneckei, peace lily, dracaena marginata, golden pathos, and green spider plant worked well for filtering Formaldehyde.

After conducting the study, NASA and ALCA came up with a list of the most effective plants for treating indoor air pollution.

The recommended plants can be found below. Note that all the plants in the list are easily available from your local nursery.

1. Philodendron scandens `oxycardium', heartleaf philodendron
2. Philodendron domesticum, elephant ear philodendron
3. Dracaena fragrans `Massangeana', cornstalk dracaena
4. Hedera helix, English ivy
5. Chlorophytum comosum, spider plant
6. Dracaena deremensis `Janet Craig', Janet Craig dracaena
7. Dracaena deremensis `Warneckii', Warneck dracaena
8. Ficus benjamina, weeping fig
9. Epipiremnum aureum, golden pothos
10. Spathiphyllum `Mauna Loa', peace lily
11. Philodendron selloum, selloum philodendron
12. Aglaonema modestum, Chinese evergreen
13. Chamaedorea sefritzii, bamboo or reed palm
14. Sansevieria trifasciata, snake plant
15. Dracaena marginata , red-edged dracaena

For an average home of under 2,000 square feet, the study recommends using at least fifteen samples of a good variety of these common houseplants to help improve air quality. They also recommend that the plants be grown in six inch containers or larger.

Here is a list of resources for more information on this important study:

PDF files of the NASA studies related to plants and air quality:
http://ntrs.nasa.gov/archive/nasa/ssctrs.ssc.nasa.gov/foliage_air/foliage_air.pdf

http://ntrs.nasa.gov/archive/nasa/ssctrs.ssc.nasa.gov/journal_mas/journal_mas.pdf

List of NASA studies related to treating a variety of air and waterborne pollutants with plants:

http://www.ssc.nasa.gov/environmental/docforms/water_research/water_research.html