How do plants clean the air?

Plants use two well-known processes to move chemicals in the air to their roots: leaves absorb certain chemicals in the air and transport them inside plant tissue down to the roots, and plants pull air down around their roots when moisture is emitted from leaves during transpiration. (1)

In the rhizosphere or root area microbes living there turn the VOCs into food for the plant. Plants and their root microbes are nature's biological cleaning machines.

We know this process happens where plants grow naturally, which is why we know that the animal/plant/microbiological world is harmoniously balanced, in general, so that each benefits from the other. We are dependent upon these interactions for our existence. But this process also occurs wherever plants end up living even indoors though the plant needs to be healthy to continue to function this way.

VOC absorption takes place during transpiration so it is not surprising that plants with high transpiration rates are able to absorb greater amounts of air. Therefore, the more efficient air cleaners are plants with high transpiration rates. Plant transpiration rates are controlled by humidity; a condition that plants attempt to balance for their optimum well-being by controlled release of moisture from their leaves. When humidity is high, plants emit less moisture into the air then when humidity is low. (2)

Where do VOCs come from?

How do VOCs get into the air especially indoors? We are surrounded by everyday man-made products, which off-gas into the atmosphere.

As well as these off-gassing products, we humans produce bio-effluents which include Carbon Dioxide which are emitted by us into the surrounding air. We are each responsible for 150 bio-effluents which is why you can really 'feel' the stale air in confined spaces – like an aeroplane – occupied by a number of people.

Should we be concerned about poor air quality?

As well as poor quality air being at the root of Sick Building Syndrome, Dr Ronald Wood comments, "We may drink 2 litres of liquid each day but we breathe in approximately 6 to 10 litres of air every minute, around 15,000 litres per day. Most urban dwellers usually spend about 80% or more of their time indoors, so the quality of indoor air becomes a major health consideration."

Airborne water-vapour enhances our absorption of these VOCs into our bodies through breathing. The cocktail of chemicals emitted by products inside our buildings put us at great risk and are slowly released into the indoor air for the lifetime of the building. Their release is accelerated by wear and tear, cutting or drilling, and stresses caused by temperature variation. (3)

(1) Environmental Protection Agency: http://www.epa.gov/iaq/voc.html
(2) Dr Bill Wolverton, NASA www.wolvertonenvironmental.com
(3) Rough Guide to Sustainability by Brian Edwards with Paul Hyatt