

Can Indoor Plants Clean a Sick Building?

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Ardisia pusilla



Ardisia pusilla



Ardisia crenata



Ardisia japonica



*Environmental Weeds
of Australia*

VOCs=Volatile (they evaporate) Organic Compounds

- I. VOCs present in many indoor situations, including Formaldehyde, Benzene, Acetone, toluene, xylene, chloroform, and vinyl chloride to mention a few
- II. Many of these are carcinogenic, and can be emitted by, especially NEW:
 - carpeting
 - wallpaper
 - office chairs
 - electronic equipment
- III. VOCs can be gotten rid of by opening windows to air out room once a day, or using activated charcoal or silica gel

ROLE OF PLANTS INDOORS

1. Decoration that is pleasing to the eye and causes mental relaxation, enabling better task focus
2. Psychological effects include a better image of self and team members
3. Plants remove VOCs by:
 - A. Removal by aboveground plant part (via stomata and/or leaf cuticle)
 - B. Removal by Roots, then above
 - C. Removal by growing medium, through roots and above

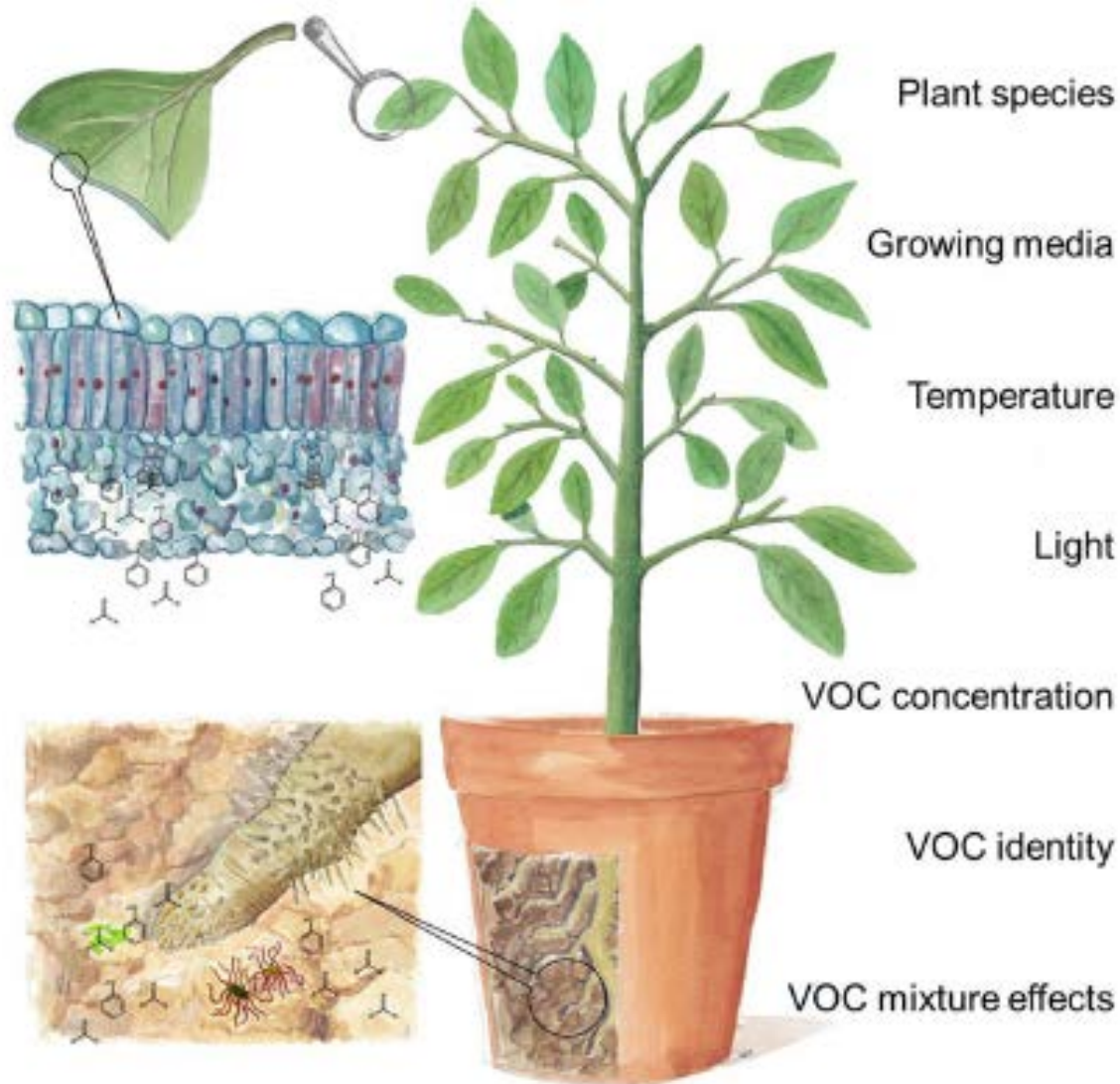


Fig. 1 Overview of VOC removal by plant. *Left:* suggested uptake of formaldehyde and toluene through the cuticle and stomata of the leaves and by microorganisms and roots in the soil. *Right:* factors that can affect plants' VOC removal efficiencies and rates (illustration by Ramón Guitián)

CONCLUSION

1. Plants remove VOCs by a variety of methods that are species-specific
2. Indoor plants used to remove VOCs from air must be in well-drained, organically (carbon)- rich soils.
3. Hydroponic plants will generally not remove many VOCs from the air.
4. Look for plants with value-added benefits (e.g., *Ardisia crenata* with nitrogen-fixing leaf nodules)

RECOMMENDED SPECIES

Common Name	Scientific Name	Plant Family	Growth Form
Mosaic Plant	<i>Fittonia verschaffeltii</i>	Acanthaceae- Shrimp Plant	Herb
Chinese Holly	<i>Ilex cornuta</i>	Aquifoliaceae - Holly	Shrub to tree
Flamingo Flower	<i>Anthurium andreanum</i>	Araceae- Aroid	Epiphytic Herb
Peace Lily	<i>Syngonium wallissii</i>	Araceae- Aroid	Herb
Roebelin Palm	<i>Phoenix roebelenii</i>	Arecaceae- Palm	Small Palm
Common Chrysanthemum	<i>Chrysanthemum morifolium</i>	Asteraceae- Sunflower	Semi-Woody Plant
Regal Geranium	<i>Pelargonium domesticum</i>	Begoniaceae- Begonia	Herb
Polk a Dot Begonia	<i>Begonia maculata</i>	Begoniaceae- Begonia	Herb
Peppermint	<i>Mentha piperita</i>	Lamiaceae- Mint	Herb
Japanese Privet	<i>Ligustrum japonicum</i>	Oleaceae- Jasmine	Shrub to tree
Boat Orchids	<i>Cymbidium spp.</i>	Orchidaceae-Orchid	Epiphyte
Cooktown (Australia) Orchid	<i>Dendrobium phalaenopsis</i>	Orchidaceae-Orchid	Epiphyte
Dancing Lady Orchid	<i>Oncidium spp.</i>	Orchidaceae-Orchid	Epiphyte
Chinese Primrose	<i>Primula sinensis</i>	Primulaceae -Primroses	Herb
Miniature Japanese Marlberry	<i>Ardisia japonica</i>	Primulaceae -Primroses	Herb with rhizomes
Coral Ardisia	<i>Ardisia crenata</i>	Primulaceae -Primroses	Herb
Miniature creeping Ardisia	<i>Ardisia pusilla</i>	Primulaceae -Primroses	Prostrate Shrub

REFERENCES

Dela Cruz, M. et al. 2014. Can ornamental potted plants remove volatile organic compounds from indoor air? *Environmental Science Pollution Research* DOI 10.1007/s11356-014-3240-x . URL:

<https://greenplantsforgreenbuildings.org/wp-content/uploads/2014/09/Dela-Cruz-2014-review-on-phytoremediation-with-indoor-plants-2.pdf>

Yang, D. 2009. Screening indoor plants for Volatile Organic Pollutant Removal Efficiency. *HortScience* 44: 1377-1381.



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