

1-1-2015

Can Indoor Plants Clean a Sick Building?

John J. Pipoly III

Find out more information about Nova Southeastern University and the Halmos College of Natural Sciences and Oceanography.

Follow this and additional works at: https://nsuworks.nova.edu/occ_facreports

 Part of the [Plant Sciences Commons](#)

Can Indoor Plants Clean a Sick Building?

John J. Pipoly III, Ph.D., FLS

UF-IFAS/Broward County Extension Education
Parks and Recreation Division

jpipoly@broward.org



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

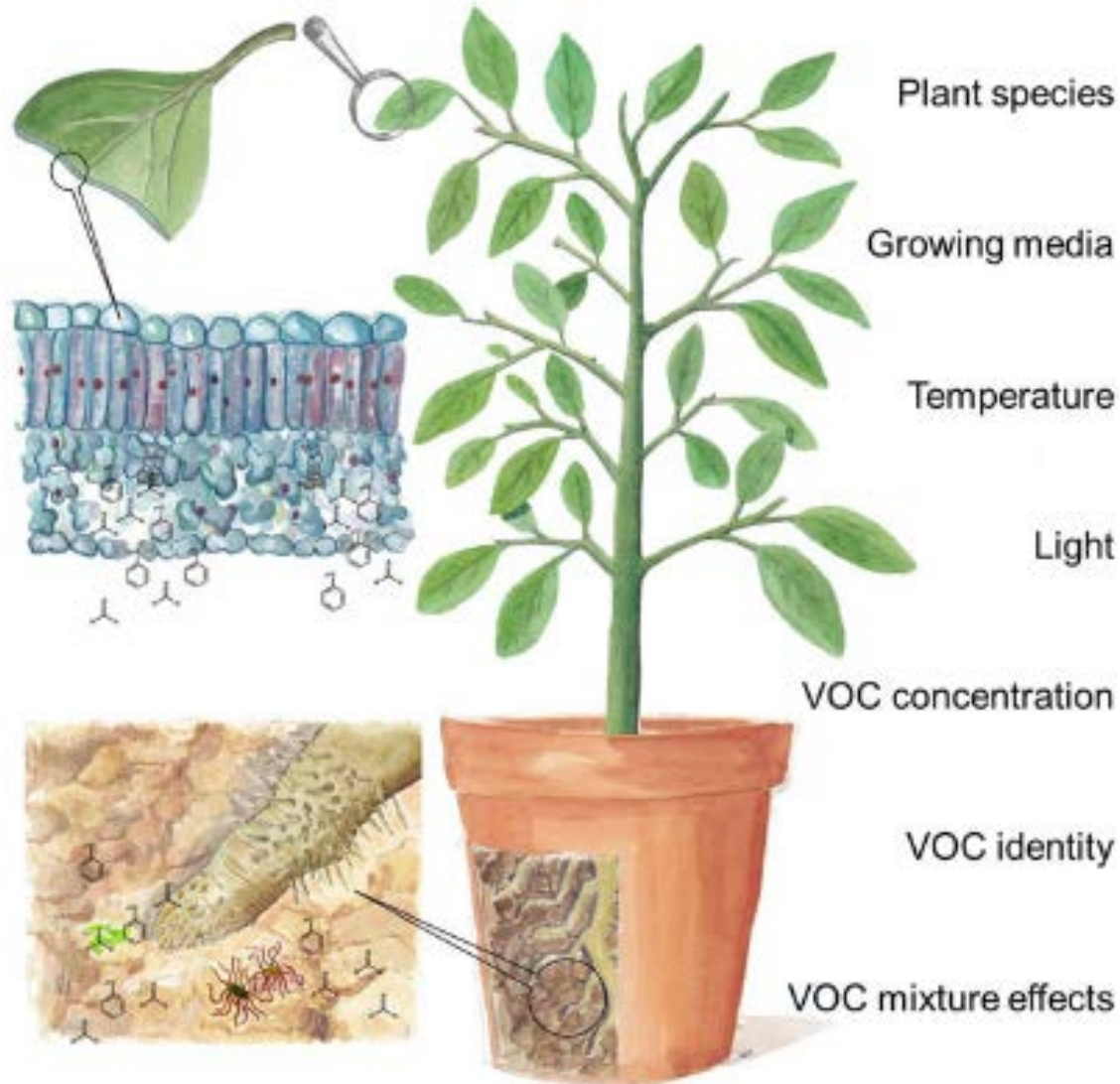


Fig. 1 Overview of VOC removal by plant. *Left:* suggested uptake of formaldehyde and toluene through the cuticle and stomata of the leaves and by microorganisms and roots in the soil. *Right:* factors that can affect plants' VOC removal efficiencies and rates (illustration by Ramón Guitián)

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.



Broward County Parks and Recreation Division UF/IFAS Extension Education Section

3900 SW 100th Ave, Davie, FL

E-Mail: mastergardener@broward.org

Website: www.broward.org/parks/extension/urbanhorticulture

**John Pipoly III, Ph. D., FLS,
Urban Horticulture & Natural Resource Management Agent rev 5-2015**

A Service of the Broward County Board of County Commissioners

Broward county programs are open to all persons regardless of race, color, religion, national origin, gender, age, disability or sexual orientation. Disabled individuals are requested to notify program two days prior to program an auxiliary aids or assistance is required. Disabled parking space and wheelchair ramp are available.

“Pursuit to Section 503 of the Rehabilitation Act of 1973 and the Vietnam Era Veterans Readjustment Assistance Act of 1974 (As Amended) this University of Florida Affirmative Action Plan ensures equal employment opportunity and advancement opportunity to all individuals. The University does not discriminate in employment opportunities or practices on the basis of race, color, religion, sex (including pregnancy, childbirth or related medical conditions), national origin, ancestry, age, disability, family care status, protected veterans status, marital status, sexual orientation or any other characteristic protected by law.”