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Popular Article

Dracaena Detox: The Leafy Air Purifier for Home

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Introduction

Urban indoor air quality (IAQ) is a global problem as most of the metropolitan population spend 90% of their life indoor. Modern countries prioritize IAQ because it can affect human health and productivity. The presence of indoor air pollutants has been strongly linked to numerous acute and chronic health conditions. One of the most common outcomes is Sick Building Syndrome (SBS), characterized by symptoms such as headaches, eye, nose, throat irritation, fatigue, nausea and exacerbation of asthma. Prolonged exposure to indoor air contaminants has been associated with more serious outcomes, including respiratory diseases and cardiovascular diseases, cognitive impairments, liver, kidney disfunction and cancer. This realization has spurred growing interest in natural, plant-based solutions to combat indoor air pollution. Houseplants are seen not only as decorative elements, but as bio-active tools for improving air quality and promoting overall wellness. These living organisms interact with their surroundings in complex biochemical ways absorbing pollutants, producing oxygen, regulating humidity and releasing phytoncides that can improve psychological well-being. Alarmingly, the World Health Organization (WHO) estimates that approximately 4.3 million premature deaths occur annually due to indoor air pollution. Among the green companions, Dracaena species have emerged as potent natural air detoxifiers. Known for their striking foliage and

minimal maintenance needs, plants like Dracaena fragrans, *Dracaena marginata* and *Dracaena deremensis* have become household favorite - not just as décor, but as functional air-purifying agents. (Burchett *et al*., 2008).

Importance

For decades, *Dracaena* species have been recognized for their role in enhancing indoor air quality, owing to their ability to absorb and neutralize harmful volatile organic compounds (VOCs) such as formaldehyde, benzene, trichloroethylene and xylene. Their popularity as houseplants stems not only from their ornamental appeal but also from their low-maintenance nature and health-promoting properties. The use of *Dracaena* dates back to ancient civilizations its name originates from the Greek word *drakaina*, meaning "female dragon," a nod to the red resin known as "dragon's blood" once prized for medicinal and ritualistic purposes. Revered in African and Asian cultures, *Dracaena* was traditionally used in folk medicine and spiritual practices. Its modern acclaim as an air purifier was cemented by National Aeronautics and Space Administration's (NASA) Clean Air Study in 1989, which identified species like *Dracaena marginata* and *Dracaena fragrans* as highly effective in removing indoor pollutants.

Permissible level of different indoor air pollutants and their impact on health. (Liu *et al*., 2019)

Air pollutant	**Duration**	**Minimum exposure**	**Health effect**
PM2.5	Annual 24-h mean	5 µg/m^3 15 µg/m^3	Eye, nose, throat and lung irritation, coughing, sneezing, runny nose and shortness of breath
O_3	8-h daily 8-h mean, peak season	100 µg/m^3 60 µg/m^3	Chest pain, coughing, shortness of breath, and throat irritation
NO_2	Annual 24-h mean	10 µg/m^3 25 µg/m^3	Respiratory infections and asthma and chronic lung disease
SO_2	24-h mean	40 µg/m^3	Respiratory system, lung function, asthma and chronic bronchitis
CO	24-h mean	40 µg/m^3	Headache, fatigue, dizziness, drowsiness, or nausea

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Dracaena marginata (red-edged dracaena), *Dracaena fragrans* (corn plant) and *Dracaena deremensis* (Janet Craig and Warneckei cultivars), are the plants demonstrated significant VOC removal capabilities. For instance, *Dracaena marginata* removed up to 80% of benzene, while *Dracaena deremensis* cultivars removed up to 50% of formaldehyde and 70% of benzene. *D. marginata* removed 1,264 µg/hr benzene and 853 µg/hr formaldehyde. *D. fragrans* removed 938 µg/hr formaldehyde and 421 µg/hr trichloroethylene (Wolverton *et al*.,1989).

D. sanderiana is a highly capable removal plant of benzene. High stomata number and crude wax extraction were also found in *D. sanderiana*. In long-term benzene exposure, *D. sanderiana* under light condition had higher benzene removal efficiency than *D. sanderiana* under dark condition at 2nd to 4th cycles (Treesubsuntorn *et al*., 2012).

Mechanism of Particle capture

Houseplants with large leaves and broad surfaces have higher stomatal density and efficient rhizosphere activity such as Dracaena, can effectively capture the pollutants particle. As air passes through the leaves of the plants, airborne particles adhere to the leaf surfaces, thus removing them from the surrounding air. This process helps reduce air pollution levels and provides cleaner and healthier air. In addition to capturing airborne particles, some houseplants can also absorb and break down VOC' s into less harmful products.

Benefits

Psychological benefits

Overall, having houseplants in indoor spaces can have positive effects on mood and mental health, providing greater feelings of relaxation, satisfaction, improving air quality, reducing stress, increasing focus, productivity, creating a sense of calm and connection to nature. These benefits contribute to healthier, more enjoyable living and working environments.

Health benefits

Crude extracts of isolated compounds from Dracaena exhibit diverse pharmacological activities including anti-inflammatory, analgesic, antibacterial, antitumor and hypoglycemic effects. They are known to support epidermal healing, protect nerve cells in the brain and enhance immune

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responses due to the presence of phenolic components like flavones, flavanes, homoisoflavanones, homoisoflavanes, chalcones, dihydrochalcones, stilbenes and flavonoid oligomers.

Growing environment

1. **Light Requirements**

Dracaena is C_3 plant it performs best under bright and indirect light levels ranging from 100 to 300 µmol m^{-2} s^{-1}. Exposure to direct sunlight may lead to leaf scorching, while insufficient light levels can result in slower growth, reduced pigmentation and diminished air-purifying capacity.

2. **Temperature and Humidity**

Ideal growth of Dracaena occurs within a temperature range of 18–26°C. Exposure to temperatures below 15°C can impede development, while temperature above 30°C may cause tip burn and physiological stress. Maintaining relative humidity between 40–60% supports optimal leaf hydration and transpiration.

3. **Watering and Substrate**

Dracaena requires a porous and well-aerated potting medium rich in organic matter. A blend of peat, perlite and coco coir offers suitable moisture balance. Overwatering should be strictly avoided, as it often leads to root rot. Irrigation is recommended only when the top 2–3 cm of soil has dried. To prevent leaf tip damage fluoride-free water is preferable.

4. **Fertilization**

A balanced water-soluble fertilizer (such as 10-10-10 NPK) applied once a month supports healthy development. Excessive fertilization particularly in low-light, should be avoided to prevent salt buildup and potential root damage.

5. **Potting and Container Choice**

Dracaena is best grown in pots with effective drainage to prevent waterlogging. Repotting every two to three years is done to avoid root congestion and to renew the substrate. Choosing the right pot size helps regulate moisture levels and minimizes overwatering risks.

6. **Pruning and Maintenance**

Trimming away old or discolored leaves improves both aesthetics and overall plant health. Dracaena can be easily propagated from stem cuttings placed in water or moist potting mix.

7. **Pest and Disease Management**

Dracaena may occasionally attract pests like spider mites; scale insects and mealybugs can be managed using neem oil or insecticidal soap. Good ventilation and careful watering practices help prevent common fungal infections such as leaf spot and root rot.

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Conclusion

Dracaena offers a comprehensive and natural solution for enhancing indoor air quality and supporting overall health and well-being. Renowned for its ability to absorb a variety of indoor pollutants including carbon monoxide, volatile organic compounds and particulate matter. Dracaena serves as an effective air-purifying plant. It also contributes to increased oxygen levels and indoor humidity improving the overall atmosphere. Notably, certain Dracaena species have shown potential in reducing microbial contamination, thus providing both chemical and biological air purification. In addition to its environmental benefits, Dracaena promotes psychological wellness by lowering stress levels, boosting concentration and productivity.

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