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**Международный научно-образовательный электронный журнал «ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ». Выпуск №66-2 (том 1) (сентябрь, 2025). Дата выхода в свет: 15.09.2025.**

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**Abstract**

Air pollution remains a critical environmental and public health issue in Turkmenistan, driven by urbanization and industrial activities. Recent research has highlighted phytoremediation—the use of plants to mitigate air contaminants—as a promising, sustainable strategy to enhance air quality. This review examines the potential of Dracaena species, a genus of resilient and popular indoor and outdoor plants, for reducing harmful airborne gases in Turkmenistan. The paper discusses the air-purifying mechanisms of Dracaena, their applicability to local environmental conditions, and prospects for improving ambient air quality.

**Introduction**

Turkmenistan experiences moderate air pollution, with particulate matter (PM2.5 and PM10) and volatile organic compounds (VOCs) constituting major pollutants that threaten public health (AQICN, 2025). Conventional pollution control methods often face technological and economic limitations. Therefore, phytoremediation offers an eco-friendly alternative that utilizes plants' natural physiological processes to remove or neutralize harmful gases such as formaldehyde, benzene, and trichloroethylene. Among various candidates, Dracaena species stand out due to their documented effectiveness in indoor air purification and adaptability to diverse growing conditions (Wolverton et al., 1989; Meyers Lemon, 2025).

**Mechanisms of Air Purification by Dracaena**

Dracaenas primarily reduce harmful gases through stomatal uptake, adsorption on leaf surfaces, and metabolic degradation. The plants absorb VOCs like formaldehyde and benzene via stomata during gas exchange. These pollutants are then metabolized into less toxic compounds or stored in plant tissues, thereby lowering atmospheric

concentrations (Newman & Reynolds, 2004). Additionally, Dracaena leaves' microstructures facilitate particulate matter capture, further cleansing the air (Gawronski et al., 2017). Photosynthesis also contributes indirectly by utilizing carbon dioxide and releasing oxygen, enhancing overall air composition.

**Adaptability and Suitability for Turkmenistan**

Dracaenas are robust, requiring moderate light and water, and tolerate filtered sunlight—conditions prevalent in urban and indoor settings across Turkmenistan (North Carolina Extension Gardener Plant Toolbox, 2025). Their low maintenance makes them feasible for widespread planting in homes, offices, and public spaces. Moreover, their aesthetic appeal can encourage adoption. Given Turkmenistan's current ambient air quality index—classified as moderate with periodic exceedances of safe pollutant levels—integrating Dracaena plants in indoor environments and green urban areas can complement existing pollution control efforts (AQICN, 2025).

**Environmental and Health Benefits**

Implementing Dracaena-based phytoremediation in Turkmenistan could lead to measurable declines in indoor VOC concentrations, reducing risks related to respiratory disorders, headaches, and other pollution-linked health effects. By improving air quality naturally, these plants may also enhance occupant comfort through increased humidity and oxygen levels (Airoasis Research Team, 2021). Furthermore, promoting green infrastructure aligns with sustainable urban planning and climate resilience goals.

**Challenges and Future Directions**

While promising, scaling up Dracaena-based air purification requires overcoming challenges such as optimal species selection, plant density, and maintenance practices tailored to local climate. Further empirical studies are needed to quantify air pollutant reduction rates in Turkmenistan's specific context. Integration with other phytoremediation species and technological interventions could enhance efficacy. Public awareness campaigns and policy incentives can drive broader implementation.

## Conclusion

Dracaena plants possess significant potential to reduce harmful gases in Turkmenistan's air through their natural air purification processes. Their adaptability and low-care requirements make them suitable for indoor and urban use, offering an accessible, sustainable tool for mitigating air pollution impacts. Future research and coordinated efforts are essential to harness these benefits effectively and improve air quality for healthier communities.

## References


1. AQICN. (2025). Turkmenistan Air Quality Index (AQI): Real-Time Air Pollution.
2. Gawronski, S. W., Omasa, K., & Lynch, J. P. (2017). Use of plants to clean polluted air: A potentially effective and low-cost phytoremediation technology. Bioresources, 12(2), 1237-1251.
3. Meyers Lemon. (2025). Benefits of Dracaena Plants - Croton Plants.
4. Newman, L. A., & Reynolds, C. M. (2004). Phytoremediation of air pollutants. Environmental Science & Technology, 38(24), 7019-7025.
5. North Carolina Extension Gardener Plant Toolbox. (2025). Dracaena. NC State University.
6. Wolverton, B. C., Johnson, A., & Bounds, K. (1989). Interior Landscape Plants for Indoor Air Pollution Abatement. NASA.