

Ornamental Plants as Air Purifiers in Urban Interiors

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INTRODUCTION

Urbanization has significantly changed human lifestyles and living spaces. High-rise buildings, air-conditioned offices, concrete structures, and enclosed shopping complexes have led to poor indoor air quality (IAQ). Many studies report that indoor air is often 2–5 times more polluted than outdoor air due to the presence of volatile organic compounds (VOCs), synthetic furnishings, cigarette smoke, plastics, wall paints, cleaning agents, and poor ventilation.

Consequently, indoor pollution contributes to asthma, headaches, eye infection, chest congestion, allergies, hormonal imbalance, and fatigue. In response to this challenge, ornamental plants have gained importance not only for aesthetic decoration but also as natural air purifiers. They absorb pollutants, regulate humidity, release oxygen, and create a calming environment—making them ideal for urban interiors.

2. Concept of Air-Purifying Ornamental Plants

Term	Explanation
Indoor Air Pollution (IAP)	Contamination inside closed buildings due to VOCs, CO ₂ , dust, chemicals, fumes.
Phytoremediation	Plants absorb & degrade toxic chemicals from air or soil.
NASA Clean Air Study	Identified major air-cleaning plants for space stations & buildings.
Biophilic Design	Architectural concept of integrating nature into built environments.
Green Interiors	Interior designing using plants for health & environmental benefits.

Thus, ornamental plants are not just decorative but also functional biological air filters.

3. Scientific Mechanisms of Air Purification

Ornamental plants cleanse indoor air through the following mechanisms:

3.1 Photosynthesis

Absorbs carbon dioxide (CO₂) and releases oxygen (O₂), refreshing air and improving breathing quality.

3.2 Phytoremediation

Plants absorb harmful VOCs such as:

- Benzene (from paint, plastic)
- Formaldehyde (from furniture, plywood)
- Xylene (from adhesives)
- Trichloroethylene (from cleaners)
- Toluene (from construction material)

3.3 Stomatal Exchange

Pollutants enter plant leaves through stomata, where they are broken down or stored.

3.4 Microbial Breakdown

Rhizospheric microbes in the soil help in degradation of harmful chemicals.

3.5 Humidity Control

Plants release water vapor through transpiration, retaining moisture levels to avoid dryness and throat irritation.

3.6 Psychological Benefits

Plants decrease stress levels, improve mood, reduce depression, and create a positive atmosphere.

4. Best Ornamental Plants for Indoor Air Purification

Plant Name	Removes Pollutants	Features	Suitable Areas
Snake Plant	CO ₂ , formaldehyde	Releases oxygen at night	Bedroom, study
Peace Lily	VOCs, mold spores	Elegant white flowers	Living room
Spider Plant	Carbon monoxide	Fast-growing, hardy	Kitchen & office
Rubber Plant	Dust & benzene	Large glossy leaves	Hall & corridors
Aloe Vera	VOCs & medicinal uses	Skin healing gel	Windows & balconies
Areca Palm	Increases humidity	Best air humidifier	Offices & malls
Pothos (Money Plant)	VOCs & CO ₂	Easy to grow	Hanging pots
Boston Fern	Cleans formaldehyde	Needs humidity	Bathrooms
Dracaena	Removes benzene & trichloroethylene	Tall indoor plant	Corporate spaces

5. Placement of Plants in Urban Interiors

Location	Suitable Plants	Purpose
Bedroom	Snake plant, Aloe vera	Night-time oxygen release
Living room	Peace lily, Areca palm	Air purification + beauty
Office	Spider plant, Money plant	Stress reduction & productivity
Kitchen	Pothos, Rosemary	Absorbs CO & smell
Bathroom	Ferns, Orchids	High humidity plants
Balcony	Aloe vera, Lavender	Medicinal & aromatic

6. Landscaping Approaches for Urban Interiors

✓ Vertical Gardens / Green Walls

Installed in apartments, malls, hotels, and metro stations. Saves space and improves IAQ.

✓ Terrariums

Small glass containers with mini plants for study tables and office desks.

✓ Hydroponic Interiors

Growing plants without soil – only water & nutrients.

✓ Hanging Pots / Wall-mounted Planters

Best for compact urban apartments.

✓ Potted Plant Corners

Combination of indoor palms, ferns, and oxygen-generating plants.

7. Challenges & Limitations

Limitation	Description
Not a full substitute for mechanical purifiers	Works as a supplement
Sensitive to light & humidity	Need proper maintenance
Allergies in some individuals	Species selection is important
Pest attack	Requires monitoring
Space limitation	Use vertical / compact setups

8. Future Prospects

- ✓ Smart indoor systems with air sensors + plant-based purification
- ✓ Green-certified buildings with compulsory interior plant design
- ✓ Urban horticulture and green architecture integration
- ✓ Use of mobile plant walls in hospitals, schools

& corporate offices

- ✓ Advancement in computer-aided interior landscaping

9. CONCLUSION

Ornamental plants are not merely decorative elements, but natural air purifiers that enhance both physical and mental well-being. They

reduce pollutants, improve oxygen levels, regulate humidity, and reduce stress—making them essential for modern urban living. With proper selection and maintenance, ornamental plants can significantly improve indoor environmental health and support sustainable and green urban development. Thus, integrating ornamental plants into urban interiors is not just an aesthetic choice – it is a necessity for a healthier future.

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