

Indoor air pollution from perfumes, fragrances and its remedies measures

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ARTICLE INFO	ABSTRACT
<p>Review Article Received on May 16, 2023 Revised on June 27, 2023 Accepted on July 24, 2023 Published on October 22, 2023</p> <p>Article Authors Vinita Ahirwar, Kusum Singh</p> <p>Corresponding Author Email vnta_ahrwr@rediffmail.com</p>	<p>Nowadays, a variety of products is available in the market for the consumer to also perfume and fragrance the air in rooms and offices. The adverse effect of indoor air pollution is twice as much dangerous as outdoor air pollution but we are not aware about poor indoor air quality or taking it lightly and avoiding it. A number of health issues are often caused due to inhaling poor indoor air quality. The environmental air pollution and indoor air pollution are inseparably linked, as well as people spend around 90% of their time staying indoors. Since air pollutants in the home are almost invisible to our eyes, it is, however, important to keep a check on the air quality. The majority of fragrances are produced from perfumes, room freshener, various sprays, paints, cleaning agents, soaps, mosquito coils, insecticides & pesticides spray, incense sticks, diya's and poojan formalities etc. come from petroleum products, and many of them have not been actually tested to see when inhaled, there are any adverse health effects in humans. Present study to focus on some best air indoor purifying plants such as snake plant, spider plant, leace lily, bamboo palm, Areca palm & money plant etc. that are found to be effective in cleaning various pollutants from the air. Therefore, keeping in mind present scenario it is recommended to keep certain indoor plants to overcome indoor air pollution especially in metro cities. Even after the covid pandemic, a number of people are suffering from lung disorders.</p>
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Air pollution is the biggest threat to our lives. It refers to the deterioration of air quality both indoors and outdoors. Various air pollutants suspended in the air are the cause of air pollution. A pollutant can harm different groups of people in different ways. However, this happens only when the desired limit levels are exceeded. Bad indoor air quality can have a severe influence on the health and productivity of people who work from home. Poor indoor air quality can cause a range of health difficulties including headaches, exhaustion, fatigue, irritation and respiratory disorders, making it difficult for employees to focus and be productive. Long-term exposure to poor indoor air quality can also result in more significant health issues like

heart diseases and cancer. An estimated 846 million people in India were exposing to household air pollution in 2017, according to the (SGAR, 2019). That forms around 60% of the country's population. Exposure to PM 2.5 was the third leading risk factor for type-2 diabetes- related deaths and disability in 2017 (APIAQH, 2018; Anne, 2009; Bjarane, 2023 and CSE, 2017). At today's time, everybody life style can no longer be imagined without fragrances and scented products. There are countless products exists for the consumers, either in form of cosmetics and household purposes, which are partly or solely intended to give off a certain fragrance or scent in sufficient concentrations to odorize a complete room, office and self-body such as various forms of

sprays, scented candles and incense sticks, diffusers and evaporators, room freshener's, perfumes, mosquito coils, paints, hairsprays, cleaning agents and home cleaners fragrance liquids, detergents, soaps etc. These all products emit VOCs, heavy metals and harmful gases etc. that contribute significantly to air pollution. If the consumer uses it, his consent to the release of certain chemicals in his home can be implied, however, he doesn't know what kind of fragrance substances and solvents will be present in which concentrations (www.stopglobaldestruction.org). A remarkable variety of fragrance substances was found and more than 100 relevant compounds were identified and quantified by (Uhde and Schulz, 2015).

A "perfume" is a fragrance that is made of dozens of substances. Scenting of household products like cleaning agents or detergents with volatile organic substances, specifically terpenes and terpenoids, has been common for many decades. Nowadays, a variety of products is available for the consumer also perfumes the air in rooms and offices. As these products contains about 4000 elements that one can use in the creation of a scent. It is more and more popular, questions concerning a possible impairment of indoor air quality arise that how much the perfumes and other scented products produce (Nazaroff & Weschler, 2004, Steinemann Anne C, 2009).

The data implies that scented products account is approximately twice as much as vehicle fuel. This means that relatively, indoor pollution has become a greater risk to handle and is contributing a lot of air pollution, because these products evaporate quickly, their VOCs end up in the air. According to the Simons National Consumer Survey (NHCS), at least 298.7 million Americans use deodorants or perfumes. In 2024, this population will rise to 306.04 million (NHCS, 2021). Researchers have tested and discovered compounds found in air fresheners and perfumes etc. that have been associated with headache, migraine and cancer e.g. formaldehyde cancer causing substance, some of the most common migraine & headache triggers are air fresheners, fabric softeners and perfumes or colognes (www.epa.gov, Karr *et al.*, 2022). Many people are allergic to perfumes. Air freshener exposures, even at low levels, have been associated with a range of adverse health effects, which include

asthma attacks, breathing difficulties, mucosal symptoms, dermatitis, infant diarrhea and earache, neurological problems, sneezing, swollen inflamed eye, coughing, respiratory system irritation and ventricular fibrillation etc. may be caused by these VOCs substances. VOCs when react with sunlight to form ozone and fine particulates matter in the air (www.epa.gov). These symptoms are sign that your body is trying to reject these harmful chemical substances and may lead to internal damage (Patel *et al.*, 2021, www.earthwatch.org, www.ncbi.nlm.nih.gov).

Teenage Depression Caused by Air Pollution

Teenagers go through many bodily changes due to air pollution in their adulthood because external factors and stressors make their life difficult. The stress caused by air pollution can lead to teenage depression and other negative effects on their bodies and mind. Adolescent or adolescent depression is a severe mental illness this lead to constant emotions of anxiety, sadness and boredom. As a result, these variables can delay the development and growth of the brain and body. Excessive exposure to CO₂, CO, NO₂, Ozone (both from indoor and outdoor) can harm brain growth and function the brain is an essential organ that helps in the functioning of the body. The whole body suffers makes harder for the brain to function normally when air pollution is rises. It also affects other parts of the body such as the lungs, kidneys, liver and eyes. Early age stress leads to teenage depression due to air pollution. Teenagers who are exposed to toxic air for longer periods are more prone to experience stress (Kazemi *et al.*, 2022, FIAHE, 2019). Working from home increases the risk of indoor air pollution exposure because people spend more time indoors, and the air inside the home may not be properly ventilated. Pollutants can accumulate due to a lack of sufficient ventilation. Telecommuting, often known as working from home (WFH) is growing more and more common in India especially after the time of pandemic covid-19 in metro cities like Delhi. Many businesses now give their employees the choice either full or part time to work from home. When analyzed graphically how bad air quality affects work from home. It was observed that especially CO₂ pollution levels were high in a home setting. It affects the productivity of employees (www.aeramaxpro.com).

Because as modern houses are becoming more and more air tight, air pollutants are accumulated very easily in a home. Due to that person feel lethargic and losses their memory coordination. An increase in air pollution decreases the employee productivity. A study by (Bharne W.

Olesen, 2023) International Centre for Indoor Environment and Energy, Technical University of Denmark, has shown that poor indoor air quality causes sick- building syndrome and that it reduces the productivity of office workers.

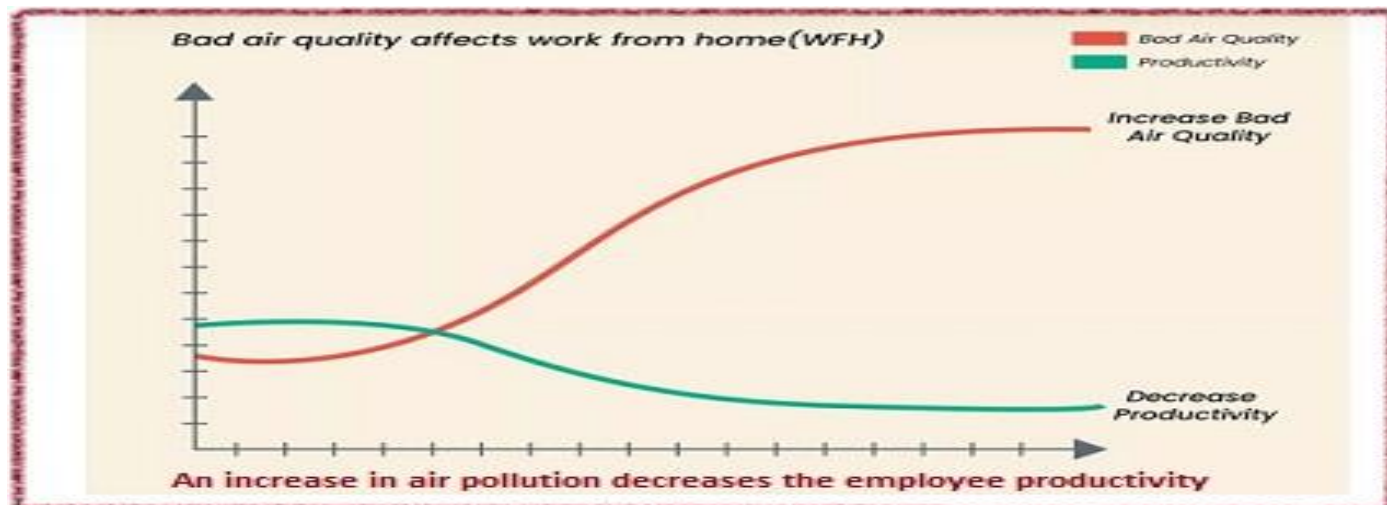


Fig 1. Poor Indoor Air Quality causes sick-building syndrome reduces the productivity of office workers

Various Indoor Air Pollutants, Their Sources and Adverse Effects on Human Health

There are several sources of air pollutants that can affect work from home productivity including (CSE, 2017, Namiesnik *et al.*, 1992, Kankaria, 2014, Karr *et al.*, 2022 and Tran *et al.*, 2020).

Particulate Matter

It is a suspended combination of liquid and solid particles in the air. They can range microscopic particles to visual particles such as smoke, soot, liquid particles and dust.

Sources

Cooking, cleaning products, smoking, furniture and building material, candle and incense burning, pets, mold and mildew, heating and cooling systems. PM from burning cigarettes, mosquito coils increased risk of cardiovascular and respiratory diseases. American heart Association journal circulation researchers published a study and examined that high level of PM 2.5 can provoke stress hormones cortisol. Cortisol further affects the levels of another chemical in the brain known as dopamine or happy hormone.

Changes in the level of hormones and dopamine leads to mental disorders and depression symptoms, for instance, low mood, lack of interest in your hobbies, feeling of worthlessness etc. This blows their self- confidence and often leads to depression. In teenagers, even a few hours of exposure to PM can cause swelling, metabolism shifts and release of stress hormone (Endocrine Disruption & Human Health, 2021). During growth years 50 to 70% of teenagers experience anxiety, impulse control and agitative disorders such as psychiatric disorders including schizophrenia and mania.

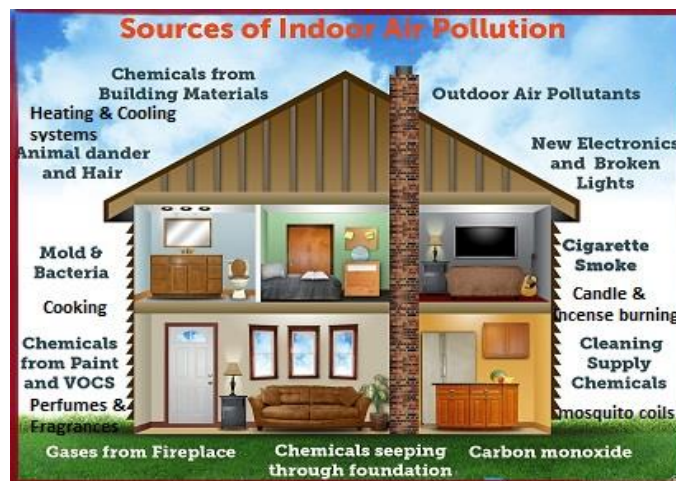


Fig 2. Sources of Indoor Air Pollution

Volatile Organic Compounds (VOCs)

Are extremely dangerous since they evaporate at ambient temperature e.g. formaldehyde, trichloroethylene, benzene etc. They are released by a number of unknown sources such as cigarette smoke, paints and solvent, cleaning agents, solvents and adhesives, air fresheners etc.

Radon

The primary sources of indoor radon include building materials, soil gas and tap water. As soil contain radium at trace concentrations, radon is likely to be one of the constituents in the gas filling soil pores. All building materials holding trace amounts of radium can release radon. It harms the lung cells. Radon exposure causes lungs cell damage that can lead to development of lung cancer. It can seep through cracks on the ground level floor and walls.

Heavy Metals

Many fragrance producing goods products and batteries etc. are releasing various types of harmful heavy metals such as lead and arsenic. That acting as very poisonous for the human body and causes various mental illness or neurological disorders to the human brain including abdominal pain, irritability, insomnia, numbness, muscle cramping, diarrhoea and nausea or vomiting etc. At very high level, it can be fatal also in extreme cases.

Carbon Monoxide

It is a toxic gas. When these levels raise indoors a variety of health, risk occurs. Its main sources are improper use of fuel burning appliances such as furnaces, stoves, fireplaces etc. Moreover, carbon monoxide gas poisoning effects people more quickly if they have heart or respiratory difficulties. The most vulnerable are pregnant women, infants and children's. Measure symptoms of CO poisoning are dizziness, weakness, chest pain, vomiting, confusion, bloody vision, extreme fatigue, loss of memory eventual fainting, difficulty with memory and coordination.

Pesticides

Organic and inorganic pesticides such as insecticides, rodenticides, herbicides and fungicides have commonly utilized as protectants for wooden building materials by impregnation or surface coating.

It also used to control and prevent pests, including bacteria, fungi, insects, rodents and other organisms. In the indoor environment, pesticides are usually semi-volatile compounds that may exist in either gas or particulate form according to their properties. Carpets, textiles and cushioned furniture are likely long- term reservoirs for organochlorine pesticides. Moreover, they are able to enter buildings from outdoors. Once inside, they can persist for months or years. Pesticide exposure is associated with adverse health risks viz. skin, eye irritation, dizziness, headaches, nausea, long-term chronic impacts causes' cancer, asthma diabetes.

Biological Pollutants

It include biological allergens known as antigens originate from no. of insects etc. e.g. animal dander, house dust, cat saliva, cockroaches, mites rodents, pollen and microorganisms like viruses, fungi & bacteria. Exposure to it can result in sensitization, respiratory infection, allergic diseases and wheezing. Sick building syndrome (SBS) refers to a group of symptoms that are linking to the physical environments of specific buildings. However, they and their causes are difficult to clearly identifying.

Mold

Growth of mold (fungal) and mildew spreads on various kinds of damp and decaying organic matter; depends on the humidity levels of the room. Highly humid room is more susceptible to mold growth. Such as Black mold is highly dangerous if inhaled directly.

Electronics Devices

Various electronics items such as laptops, tablets and smart phones emits a very harmful radiations i.e. UV rays which are ultimately fatal for human body and mind. It causes a very curious adverse effect especially on kids, children's, teenagers and students; that disturbs the biological clock or circadian rhythms of human body. Due to which level & release of melatonin hormone altered and it ultimately disturbs the sleeping pattern of humans. Various types of skin disorders i.e. cancer are also exist by the adverse impacts of UV rays. During time of covid pandemic, when everything goes on online mode, a number of people are suffering from these adverse impacts.

There are Some Alternatives to using Perfumes, Fragrances and Air Fresheners

We will not be able to eliminate these goods, but we can certainly strive to lessen their influence by leading a healthy lifestyle. There are some of the ways using which can avoid perfumes or fresheners (Tran *et al.*, 2020):

- Removing the source of the odor.
- Increasing ventilation by opening a window or using an exhaust fan.
- Regular cleaning and vacuuming your home, equipment's etc.
- Improving and increasing ventilation by maintaining HVAC system
- Using an air purifier when other methods are insufficient.
- Monitor your house air pollution with 'Prana indoor air quality monitors' and know the air you are breathing. Installing 'Prana air purifier' can help to clean indoor environment from harmful toxic elements present in air (www.pranaair.com/blog).
- Keep a tap on indoor smoking; allow no one to smoke indoors. Check humidity level in your house.
- Inspect for any leaks in your home areas such as kitchen, bathroom, basement etc.
- A check on the fuel burning appliances, especially gas stoves and water heaters; these must be regularly serviced and placed in a proper ventilation space.
- Watch out for any mold or mildew growth in the corner of your rooms.
- Call the pesticides for a home inspection.
- Look at the furniture in your home and see if they need any remodeling.
- If you use odor masking chemical products, consider removing them.
- Instead of it using something, nature- based made products such as Chandan etc.
- To eliminate use of air freshening devices etc.
- Keep CO detectors installed in your house to alert you if CO levels begin to increase.
- Never use portable heaters or lamps while sleeping in confined location.
- Test the blood to detect the level of CO, lead and arsenic poisoning in your body. One can measure carboxy hemoglobin (COHgb) levels in the blood and estimate the severity of CO poisoning. The more quantity of carboxyhemoglobin, the more is your exposure to CO.

Some Best Indoor Air Purifying Plants Following here:

Some indoor air purifying plants can provide an efficient, low-cost, self-regulating, sustainable, immune booster, bioremediation system for indoor air pollution and improve human well-being and productivity without having any side effects (Singh, 2021, Tarran, 2007, Wolverton, 1989, Raina *et al.*, 2021).

Peace Lily (*Spathiphyllum wallisii*)

One of the popular indoor plants belongs to Araceae family. It was found to be one of the most effective plants, which remove alcohol, ammonia, formaldehyde, benzene, trichloroethylene, xylene pollutants. Xylene is used as a solvent in the printing, rubber and leather industries.



Fig 3. Peace Lily (*Spathiphyllum wallisii*)

Snake Plant (*Dracaena trifasciata*)

Its other name is 'Sansevieria' belongs to Asparagaceae family; one of the hardiest and a perfect indoor plant which does not require bright or sun light as well as frequent watering. It was found to be one of the most effective air purifier plants, which remove benzene, formaldehyde, trichloroethylene, xylene and toluene from the air.



Fig 4. Snake Plant (*Dracaena trifasciata*)

Bamboo Palm (*Chamaedorea seifrizii*)

Bamboo palm is categorized under plants family Araceae, also called the 'reed palm'. Plant likes to grow under shade and humid conditions under tree in rain forests. It is effective in cleaning trichloroethylene, benzene, formaldehyde, xylene and toluene from the air.



Fig 5. Bamboo Palm (*Chamaedorea seifrizii*)

Money Plant (*Epipremnum aureum*)

It is one of the most common houseplants and commonly called golden pothos, devil's ivy etc. It is a species of the plant family Araceae. It is effective in cleaning formaldehyde, benzene, trichloroethylene, xylene and toluene from the air. Money plant is one of the hardiest plants, which do well in most of the indoor environmental conditions.



Fig 6. Money Plant (*Epipremnum aureum*)

Flamingo Lily (*Anthurium andraeanum*)

Anthurium is popular gift plant; it is a species in the plants family Araceae, native to Colombia and Ecuador. *Anthurium* has heart shape shiny green leaves and beautiful flowers, which last for several months after bloom. It is effective in removing formaldehyde, ammonia, xylene and toluene from the air.



Fig 7. Flamingo Lily (*Anthurium andraeanum*)

Aloevera (*Aloe vera*)

Aloe vera is a succulent plant species of the genus *Aloe* categorized under plants family Asphodelaceae, it is one of the most amazing plants, which are beneficial for a multitude of problems, and it has been used for medicinal purpose from ancient times. It is very hardy to adverse weather conditions and suits to grow in bright light and deserts. It is effective in cleaning formaldehyde and benzene.



Fig 8. Aloevera (*Aloe vera*)

Areca Palm (*Chrysalidocarpus lutescens*)

It is a species of flowering plant in the Araceae family, native to Madagascar. They also called as 'Butterfly palm'. It is one of the most popular foliage houseplants, which are effective in cleaning formaldehyde, xylene and toluene. Toluene most commonly found in glues, nail polish remover, paints thinner and correction fluid.



Fig 9. Areca Palm (*Chrysalidocarpus lutescens*)

Boston Fern (*Nephrolepis exaltata*)

Boston fern is a species of genus *Nephrolepis* in the Nephrolepidaceae family, which is native to humid forests and swamps. It is effective in removing and cleaning formaldehyde, xylene, toluene and airborne germs, molds, bacteria's from the indoor air.



Fig 10. Boston Fern (*Nephrolepis exaltata*)

Kimberly Queen Fern (*Nephrolepis oblitterata*)

It is native to humid forests and swamps and species of genus *Nephrolepis* in the family Nephrolepidaceae. It is effective in removing airborne germs, molds, bacteria's, formaldehyde, xylene, toluene from the indoor air. It is one of the hardiest houseplants, which are identical to Boston fern except it has upright growing habit.



Fig 11. Kimberly Queen Fern (*Nephrolepis oblitterata*)

Spider Plant (*Chlorophytum comosum*)

It is an herbaceous perennial houseplant; falls in Asparagaceae plants family, native to Southern Africa. It is popular easy care, elegant and fast growing houseplant. It is one of the top varieties plant for removing VOCs. Spider plant found to clean formaldehyde, toluene and xylene.



Fig 12. Spider Plant (*Chlorophytum comosum*)

Janet Craig (*Dracaena deremensis*)

Dracaena deremensis is one of the popular houseplants; it is a species from *Dracaena* genus counted under Asparagaceae plants family. It is hardy to adverse weather conditions and suits to grow indoors. It is effective in cleaning benzene, formaldehyde and rated as one of the best plant for removing trichloroethylene pollutants from the air.



Fig 13. Janet Craig (*Dracaena deremensis*)

Striped Dracaena (Warneckii) (*Dracaena fragrans*)

Dracaena deremensis 'Warneckii' is another popular white stripes houseplants, it is counted under Asparagaceae plants family. It is hardy to adverse weather conditions and suits to grow indoors. It is effective in cleaning formaldehyde, benzene and trichloroethylene chemicals from the air.



Fig 14. Striped Dracaena (Warneckii) (*Dracaena fragrans*)

Cornstalk Dracaena (*Dracaena fragrans*)

Dracaena fragrans 'Massangeana' is other common and popular houseplants, counted under Asparagaceae plants family. It is also hardy to adverse weather conditions and suits to grow indoors. It is effective in cleaning benzene, formaldehyde and trichloroethylene VOCs from air.



Fig 15. Cornstalk Dracaena (*Dracaena fragrans*)

Barberton Daisy (*Gerbera jamesonii*)

'Gerbera' is one of the most popular plants with diverse colored shining flowers; it is a genus of flowering plants family Asteraceae (daisy family). The plant is hardy to adverse weather conditions and suits to grow in bright light. It is effective in cleaning benzene, formaldehyde and trichloroethylene VOCs from the air.



Fig 16. Barberton Daisy (*Gerbera jamesonii*)

English Ivy (*Hedera helix*)

English Ivy is one of the most popular indoor vine plants in Europe; it is a species of flowering plant in the family Araliaceae, native to most of Europe and western Asia. It was found to be one of the most effective plants, which remove VOCs such as benzene, formaldehyde, trichloroethylene, xylene and toluene from the air.



Fig 17. English Ivy (*Hedera helix*)

Chinese Evergreen (*Aglaonema commutatum*)

Aglaonema is popular indoor plants comes from Arum plants family araceae which is native to tropical and subtropical regions of South Asia. It is found to be effective in cleaning benzene and formaldehyde pollutants.



Fig 18. Chinese Evergreen (*Aglaonema commutatum*)

Heartleaf Philodendron (*Philodendron hederaceum*)

Heartleaf Philodendron is famous for listing outstanding low light houseplants. It species under genus *Philodendron* categorized in the plants family Araceae, it is found to be effective in cleaning formaldehyde only.



Fig 19. Heartleaf Philodendron (*Philodendron hederaceum*)

Lace Tree Philodendron (*Selloum philodendron*)

Selloum philodendron is species under genus Philodendron categorized in the plants family Araceae, famous for listing outstanding low light houseplants. It is commonly known as Lace Tree Philodendron. It is found to be effective in cleaning formaldehyde.



Fig 20. Lace Tree Philodendron (*Selloum philodendron*)

Elephant Ear Philodendron (*Alocasia macrorrhizos*)

It is species under genus Philodendron categorized in the plants family Araceae, famous for listing outstanding low light houseplants. It is found to be effective in cleaning formaldehyde only.



Fig 21. Elephant Ear Philodendron (*Alocasia macrorrhizos*)

Rubber Plant (*Ficus robusta*)

Rubber fig plant is species under genus *Ficus* categorized in the plants family Moraceae, native to South Asia. The plant is found to be effective in removing formaldehyde from indoor air.



Fig 22. Rubber Plant (*Ficus robusta*)

Dendrobium Orchids (*Dendrobium nobile*)

Pigeon orchids are ever-popular indoor potted plants belongs to family Orchidaceae and adapt to different types of environments, which is one of the reasons they are popular and so easy to maintain. It also called cane orchids; they have smaller flowers of typically white or purple color that grow in rows stalks that arise from thick canes.



Fig 23. Dendrobium Orchids (*Dendrobium nobile*)

Dumb Canes (*Dieffenbachia seguine*)

Leopard lily is a genus of tropical flowering plants in the family Araceae, native to the Mexico. It is found to be effective in cleaning xylene and toluene chemicals from the air.



Fig 24. Dumb Canes (*Dieffenbachia seguine*)

King of Hearts (*Lamprocapnos spectabilis*)

King of Hearts is a flowering plant with fern-like leaves and an inflorescence of drooping pink, purple, yellow or cream flowers. It is a species of genus *Dicentra* categorized under the plants family Papaveraceae, native to the North America. The plant is found to be effective in cleaning xylene and toluene from the air.



Fig 25. King of Hearts (*Lamprocapnos spectabilis*)

Moth Orchids (*Phalaenopsis*)

Orchids are ever-popular indoor potted plants and adapt to different types of environments, which is one of the reasons they are popular and so easy to maintain. They help in removing many small microorganisms and indoor pollutants from the air.



Fig 26. Moth Orchids (*Phalaenopsis*)

Banana Tree (*Musa paradisiaca*)

Banana is a large herbaceous flowering outdoor plant belongs to Musaceae family, native to tropical Indomalaya and Australia. It is found to be effective in cleaning formaldehyde from the air.



Fig 27. Banana Tree (*Musa paradisiaca*)

Dwarf Date Palm (*Phoenix roebelenii*)

It is a species of date palm categorized under the family Areaceae, native to Southeastern Asia. It is effective in cleaning formaldehyde, xylene and toluene pollutants.



Fig 28. Dwarf Date Palm (*Phoenix roebelenii*)

Chrysanthemum (*Dendranthema grandiflorum*)

It is commonly known as Mums of Chrysanth. One of the most popular outdoor flowering plants categorized under the family Asteraceae. It was found to be one of the most effective plants which remove and cleaning ammonia, benzene, formaldehyde, trichloroethylene, xylene, toluene and several other known pollutants from the air.



Fig 29. Chrysanthemum (*Dendranthema grandiflorum*)

Gerbera Daisy (*Gerbera spp.*)

It belongs to family Asteraceae and commonly known as 'Transvaal or Barberton daisy'. It is very effective to remove trichloroethylene chemical typically found on dry cleaning. It also filters benzene and improves sleep by giving oxygen while observing carbon dioxide.



Fig 30. Gerbera Daisy (*Gerbera spp.*)

Golden Pothos or Devil's Ivy (*Scindapsus aureus*)

It belongs to Arum family (Araceae) and it filters formaldehyde. It is hardy indoor foliage houseplant.



Fig 31. Golden Pothos or Devil's Ivy (*Scindapsus aureus*)

Red- Edged Dracaena (*Dracaena marginata*)

It belongs to Asparagus family and filtering out xylene, trichloroethylene and formaldehyde, typically found in lacquers, varnishes and gasoline.



Fig 32. Red- Edged Dracaena (*Dracaena marginata*)

Conclusion

In conclusion, we can clearly see how perfumes or fragrances and other scent producing products are harming the indoor environment and our physical and mental health. A range of household products emit VOCs PM, CO, Ozone, CO₂, radon, heavy metals, aerosols, pesticides, biological allergens and microorganisms that contribute significantly to indoor air pollution and can lead to diminished IAQ and causes many adverse effects on human health. We see, there are some volatile or semi volatile compounds in the gaseous form or attached to particulate matter. This disrupted the endocrine system of the body by affecting the release of that particular hormone.

It resulted that some endocrine disrupting chemicals are occur in indoor air also such as furans, biphenyls etc. So, avoid the usage of devices that emits pollutant into the air. Take simple measures during cooking especially when frying food with appropriate ventilation. Whenever it possible avoiding the use of incense sticks, candles & room fresheners etc. and restricting the infiltration of outdoor air, especially on days when pollution levels are high can help to keep a check on indoor air pollution in urban households. It is important to know that buildings in India often have natural ventilation and tent to be leaky. Employees can enhance the air quality in their homes by opening windows to boost ventilation, and utilizing air purifiers or fresh air machines. Special care is needed to fully sealed building. In India, indoor air pollution is as bad as outdoor air.

We should all learn and educate about the factors that are leading to high levels of air pollution in our home area and try to eradicate them. To reduce indoor air pollution's impacts, many strategies and approaches for the control and reduction of pollutant concentrations have been taken. So, let us join our hands together to spread the indoor air pollution information that can save someone's life. Therefore, keeping in mind present scenario it is recommended to keep certain indoor plants boost up your immunity power and to overcome indoor air pollution. It will prove to be effective for the control and enhancement of indoor air quality for the future.

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