



Artificial forest air and light-based chemical reactions tackle indoor pollution

Horizon-Magazine, 04 September 2018

The air in our offices and homes can contain a higher mix of chemicals than outdoors, but next-generation purifiers - including one that uses plants as natural biofilters and another that turns pollutants into water and carbon dioxide - are aiming to absorb the harmful particles and let us all breathe a bit easier.

Detergents, tobacco, cosmetics, new furniture, paints, printers and even pets – all these release different chemicals that millions of people breathe on a daily basis. Some are harmless, but others can cause a wide range of short- and long-term health problems, from eye irritation and headaches to heart problems and cancer.

'The biggest risk at the moment is we don't fully understand human bodies,' said Niko Järvinen, founder of Naava, a Finnish company that improves indoor air quality using plants.

Järvinen says that limits of acceptable exposure to indoor pollutants are 'at best' decided by researching a single chemical's impact on our health. But this approach doesn't consider the potential health effects when different chemicals interact with each other – which could change a chemical's level of toxicity and pose a greater risk to humans.

'For chemicals being used commercially there is usually info available when they are harmful to health in terms of six, eight or ten hours,' said Järvinen. 'They never take into account if you have two, three or a hundred chemicals (in the air at the same time).'

In an office environment the air could contain over 300 chemicals, adds Järvinen, but the risk isn't coming from the amount of chemicals – it is more from the mix, because it is harder to tell if a perceived safe chemical has interacted with other chemicals and become harmful.

These Plants Can Quickly Filter Toxins From Water

Discover Magazine, 04 September 2018

Want cleaner drinking water, free of toxins and contaminants? Mother Nature's here to help.

A number of studies have come out over the past year looking at the role different plants could play in remediation, i.e. the removal of dangerous substances. This green technology is known as phytoremediation, from the Greek "phyto" for plant, and "remedium" for restoring balance.

Take, for example, moss. A non-vascular plant, mosses lack a root system, absorbing water and nutrients throughout their entire bodies. Researchers at the RIKEN Center for Sustainable Resource Science (CSRS) in Japan published a study last January showing that the moss *Funaria hygrometrica* can absorb an impressive amount of lead thanks to a special kind of acid contained in its cell walls.

After 22 hours of exposure, the moss cells had absorbed up to 74 percent of their dry weight in lead. Some 85 percent of the accumulation happened within the cell walls, which absorbed lead even after being removed from the living plant.

A few months later, a group at Stockholm University in Sweden published another pollution-eating moss study, this one demonstrating that the aquatic moss *Warnstofia fluitans* can remove arsenic from water with astonishing speed, showing an 80 percent decline in arsenic levels from a container of water in less than an hour. Over 90 percent of the arsenic taken up was bound firmly to the moss tissue.

This sort of phytofiltration could be particularly useful in areas like northern Sweden, where naturally occurring arsenic sometimes seeps into water supplies due to mining operations.

Another low-cost path to cleaner water may be lying in your produce drawer. Based on the work of Singapore's Suresh Valiyaveetil, Dickinson College chemistry professor Cindy Samet and her students boiled, dried and crushed a variety of seeds and peels before placing them in contaminated solutions.



CM Arvind Kejriwal launches plantation drive to improve air quality in National Capital

DNA India, 09 September 2018

With an aim to improve the air quality of the national capital, Delhi Chief Minister Arvind Kejriwal initiated a mega plantation drive on Saturday in which more than five lakh trees and saplings were planted at 643 locations across the city.

Addressing the gathering on the occasion at Garhi Mandu in North East Delhi, after planting a sapling himself, the Chief Minister said "Delhi is battling severe air pollution and we can feel the dust around us, all of us are responsible for this situation and now the onus is on all of us to resolve this."

At Garhi Mandu, more than 6000 children, volunteers, NGOs, RWAs and villagers participated in the mass plantation drive. About 60,000 plants had been planted at the venue and in adjoining areas. The Forest Department in association with 132 Eco Task Force planted about 75,000 plants upto 02:00 PM at this venue. During this campaign more than 3500 school children, teachers, army personnel, senior government officials and local residents carried out the plantation.

"Latest studies show that 70 % of air pollution in Delhi is caused by sources which are outside Delhi, mainly in the neighbouring states, and Delhi itself is responsible for only 30 % of air pollution in this city. This, however, cannot be an excuse for us to remain idle and sit quietly. We will have to do whatever we can to control air pollution, since we are the contributors so we ourselves will have to find the solution for external and internal sources of air pollution in Delhi," Kejriwal said.

Various MLAs led the plantation drives in their respective constituencies with the cooperation of RWAs and market associations. School children across Delhi enthusiastically participated in the plantation drives.

Managing Delhi's toxic wastes to improve air quality

Observer Research Foundation, 10 Sep 2018

Waste management and air pollution are becoming the leading concerns of public health in the national capital of Delhi. The toxic subsystem created by ill managed waste and its disposal adds to the worsening air quality of Delhi. In addition, a study by Ganga Ram Hospital has revealed that 50% of the population of Delhi is at risk of contracting lung cancer even if they do not smoke. Maybe it's time to ring the alarm bells.

The Lancet Commission on pollution and health ranked India number one with 2.51 million deaths in 2015 due to pollution. Furthermore, the ambient air quality report of 2017 (Delhi), as released by the Central Pollution Control Board of India, shows that there were only 45 days with satisfactory air quality in Delhi through 2017. As of May 2018, there has only been one day with satisfactory air condition in the Delhi-NCR region .

'Satisfactory air days' as per the Air Quality Index legend is acceptable; yet people suffering from respiratory ailments have a tough time.

Air Quality in Delhi has been deteriorating at an alarming pace. The main causes for this include diesel, petrol and coal combustion (50%), biomass burning (20%), industries (20%) and the rest being dust deposits. Out of these cases, the role of waste management systems contributing to air pollution in Delhi is often overlooked. Similar to emissions from power plants, the waste management systems located in the city add some of the most harmful particulate matter to the already unbreathable Delhi air.

Waste management is carried out in two ways by the five Municipal Corporations responsible for waste disposal. On a daily basis, Delhi generates 9,500 tonnes of waste which is disposed of either through dumping at the three commissioned landfill sites or by incineration at three 'Waste to Energy' plants built in and around the national capital.



How to improve your home's air quality

Philly Voice, 12 September 2018

When you think of air pollution, your mind most likely conjures outdoor scenes of a bustling, heavily-trafficked city. But pollution affects indoor environments, too, and risk factors associated with pollution aren't restricted solely to urban areas. Indoor pollutants found in common household items like furniture, carpeting, paint, air fresheners, and conventional cleaning products can put you and your family at risk for health complications, including asthma.

The Environmental Protection Agency warns that the effects of indoor irritants and allergens are becoming increasingly problematic, as people are spending more time indoors than ever before. Luckily, there are ways to combat the complications caused by pollution by improving the air quality in your home.

An air purifier is a device that cleans the air by removing common contaminants found in most indoor spaces. Active air purifiers do this by way of ionization, a process that neutralizes dust particles and harmful gases like formaldehyde, sulfur dioxide, and hydrocarbon compounds. Inactive air purification units, on the other hand, remove pollutants using a filter.

With hundreds of different models ranging in price from \$100 to \$1,000, it's important to conduct a little research before making your purchase to ensure you end up with a machine that suits your space. A recent study conducted by NASA concluded that not only do house plants release oxygen, they effectively remove air pollutants commonly found in most indoor environments. Products used in many homes, like paint and paint thinner, glues, adhesives, and cleaning supplies, all contain volatile organic compounds, otherwise known as VOCs. Breathing these chemicals day in and day out can take a toll on your health, and may aggravate asthma and allergies.

Five Indoor Plants To Curb Air Pollution And Purify Air

Republic World, 27 September 2018

India is developing at a fast pace, and so are its people. This is adding to making new buildings, new machines, new cars, and new facilities like air conditioners. Though development is one thing, sustainable development is another. Unfortunately, nature is bearing the cost of these advances. Acres of land is getting deforested to make way for new roads and new buildings for human consumption.

Due to the rising number of pollutants and the dwindling number of trees and green cover, the air which we breathe is no longer fresh. While afforestation is the ultimate solution to this problem, trees do take a long time to grow. To address the problem immediately, surround yourself with as many plants as you can. The ultimate effect would be cleaner, fresher air.

The plant removes more toxic gases than any other in the list. It is effective in purifying toluene and xylene, gases which are extremely hazardous to human health. It also emits huge amounts of water vapours, beneficial for people living in places with dry air. The plant needs to be watered frequently.

The plant is great in purifying the air. It requires minimal water, and are best to be kept indoors. It is also known by its unusual name 'Mother-in-law's Tongue'.

The plant is known to purify toxic gases such as carbon monoxide and formaldehyde. They are the best to remove acetone and alcohols from the air. It purifies and humidifies the air. They are generally easy to care. The plants also give beautiful fragrant white flowers which are pleasing to the eye. However, the plant can be toxic to human touch, so it must be handled with caution.

Lemongrass is an easy-to-grow-and-maintain plant and makes the air inside breathable. Since time immemorial, these plants have formed a vital part of ancient Chinese medicines and are great for the body. Lemongrass essential oils are popular all around. Growing them at home is an even better choice.



Climate change kills Antarctica's ancient moss beds

BBC News, 25 September 2018

Emerging from the ice for a brief growing season every Antarctic summer, the lush green mosses of East Antarctica are finally succumbing to climate change.

That is according to a study of the small, ancient and hardy plants - carried out over more than a decade. This revealed that vegetation in East Antarctica is changing rapidly in response to a drying climate. The findings are published in the journal *Nature Climate Change*.

"Visiting Antarctica, you expect to see icy, white landscapes," said lead scientist Prof Sharon Robinson from the University of Wollongong, in Australia. "But in some areas there are lush, green moss beds that emerge from under the snow for a growing period of maybe six weeks."

While West Antarctica and the Antarctic Peninsula are some of the fastest warming places of the planet, East Antarctica has not yet experienced much climate warming, so the scientists did not expect to see much change in the vegetation there. "But we were really surprised when we saw how fast it was changing," Prof Robinson said.

"After a pilot study in 2000, we set up monitoring in 2003. When we returned in 2008, all these green moss beds had turned dark red, indicating they were severely stressed. It was a dramatic change.

"They change from green to red to grey if they get really stressed.

"The red pigments are the sunscreen and drought stress protective pigments they produce to protect themselves - antioxidant and UV screening compounds. "Grey means they are dying."

When their study started, the moss beds were dominated by a species called *Schistidium antarctici*, which can survive long periods under water. By 2013, many of the beds the team studied were being encroached by two other moss species that thrive in drier conditions and are less tolerant to being submerged.

Climate change affecting the flora and fauna of the high Himalayas: study

Down to Earth, 27 September 2018

A new study by Dehradun-based Wildlife Institute of India (WII) has revealed that the upper reaches of the Himalayas are warming, something that will put local flora and fauna at tremendous risk.

The study was begun in 2016 and is being monitored by the National Action Plan on Climate Change. It was conducted in the basin of the Bhagirathi river near Gaumukh in Uttarakhand. The study region is located at an altitude between 3500-4500 metres. At 4,500 metres, the maximum temperature touches 5 degrees Celsius, while the minimum plunges to -14. At 3,500 metres, the maximum temperature is 10 degrees Celsius, while the minimum is around -2.5 degrees Celsius.

The study has revealed that there has been a rise of at least 0.5 degrees Celsius in the temperature of the area, accompanied by an almost 10 per cent variation in humidity levels.

According to WII scientist S Sathyakumar who led the study, the temperature variation is affecting plants and consequently, animals, in the region. "Flowering patterns and budding of leaves are now happening in May instead of June. Rains are happening in late September which is unusual since this is the autumn season. In response to the changed temperatures in alpine meadows which are the grazing and hunting sites for the species inhabiting the region, premature budding and flowering happens in plants. This leads to a change in the activities of insects. In response, birds will have to change their patterns. Therefore, the entire cycle of an area changes," he told the *Times of India*. Flora affected include the Himalayan birch, White lily, Tibetan sea buckthorn, Spotted heart orchid, Himalayan fir and Sikkim Rhubarb.

Mammals likely to be affected include the Snow leopard, Musk deer, Kashmir stag and Himalayan mouse hare. "Our researchers have identified that the Himalayan mouse hare, a kind of rodent unique to the alpine area is unable to adapt to the new environment.