राष्ट्रदुत

#INNOVATION

Genetically Engineered Houseplant

The future of air filtration is going green – literally



or those of us with seasonal depression or anxiety, houseplants can offer immense comfort. In fact, adding loads of leafy things to your home has been shown to boost mood and relieve anxiety – in short, they specially designed plant can iterally clear the air.

A Paris-based start-up called Neoplants aims to har ness the natural air-filtering properties of plants and turn them up to 11. By genetically engineering both a pothos (Epipremnumaureum) plant and its associated root microbiome, the team behind Neo plants created an organism they claim is capable of doing the air-purifying work of up to 30 plants. The company's first high-tech houseplant, called Neo P1, recently hit the mar-

with flora because they want ed a way to purify air without using electricity - this was mainly for sustainability puroses, ensuring that their product wouldn't require power from fossil fuels and could recycle pollutants permanent-

Coincidently, public interest in air quality has peaked in recent years. "One of the side effects of the pandemic is that people are much more aware of what's in the air they breathe." says Patrick Torbey. a molecular biologist and chief technical officer of Neoplants. Not to mention, worsening

wildfires sparked by climate change-fuelled drought and rising temperatures have made indoor air quality a priority for the millions of people affected globally. Now, by providing green electricity-free air filtration,

Neoplants hopes to rid your home of both pollutants and Here's the background -Volatile organic compounds (also known as VOCs) are

highly reactive chemicals that are commonly found in things like paints, cleaning supplies, building materials, and pesticides. As a result, they tend to be abundant in indoor air. Unfortunately, they're not particularly good for human health VOCs are known to cause headaches, eye and throat irritation, and in some extreme cases, even liver damage or cancer.

The trouble is, most VOCs are very tiny molecules, which makes them extremely difficult to remove from indoor air with a mechanical filter. Even the molecules large enough to be filtered are simply removed and re-released in a different location, rather than neutral-

ized or eliminated completely.

But plants have an advantage here over HEPA filters: Their small size means that VOCs can be absorbed and me tabolized by greenery with relative ease. While a commonly cited 1989 NASA report claimed that plants can clear ment, more recent research found that flora only has a modest effect on these types of

It turns out that plants just need a little metabolic tweak ing to get the job done, according to the Neoplants team. What's new - Neoplants

first product is designed to please. "We started with one of the most popular houseplants in North America," the pothos vine, which is also known as devil's ivy, says Lionel Mora, the start-up's co-founder and chief executive officer.

To program the pothos vine to scrub the air, the team had to go where no lab had gone before. Most bioengineers start with a lab-friendly model organism, like Arabidopsis thaliana or Nicotianabenthamiana, whose genomes are napped and annotated six

But the Neoplants team had to map the entire pothos genome themselves, and then determine which genes to target for maximum VOC filtration. "It's like trying to build a plane while flying." Torbey says.

The process took four years of near-constant work, but in the end, the engineers managed to create a plant that can metabolize four major indoor pollutants, including formaldehyde and toluene. The customized flora can even absorb certain VOCs, like the carcinogen benzene, that are present in wildfire smoke.

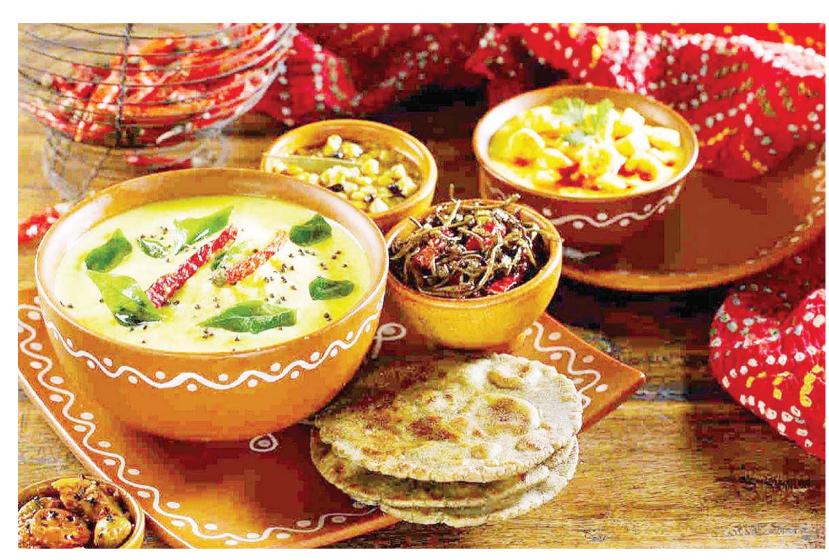
But the real breakthrough came from modifying the microorganisms living in the plant's roots. The team inserted genes from extremophile bacteria, which thrive in inhospitable environments by eating toxic chemicals, into these symbiotic microbes. This tweak in turn boosted the plant's pollutant-metabolizing

And to ensure that they comply with FDA standards, the engineers were careful to avoid sections of the genome that could enhance the plant's survival in the wild. "We don't give a selective advantage to the plant. We don't make it grow faster, we don't increase its resistance to pesticides," Torbey explains. "We're not touching any of that."



The dish was aloo-pyaz curry and a thick hath ki roti, baked on a griddle, placed upside down on an earthen chulha. Impatiently I dipped a piece of roti in the curry and put in

the mouth full of saliva. Instantaneously my mouth, stomach and entire digestive system got burnt not with the heat of the food but the chilli, making me cry, forgetting all manners. I used water to douse the fire but of no avail. Within seconds my head and face were full of sweat and water started flowing from nose and eyes.



Hokum! Nakhi Koni (...2)



o have my first field experience I had been assigned an enquiry by my boss. the DFO Udaipur, in the forests falling under the naka Kodiyat. After the driver was gone, Chen Singh, the

presently in-charge of this naka, gave me a detailed information about the working and mal practices adopted by the cooperative society so far, for illicitly smuggling bamboo and other timber from areas not falling under its lease agreement. He had booked number of cases against the society's staff and labourers. I decided to inspect the area early morning Now Chen Singh enquired if I

would like to have chicken, which he cooks so well but was really fond of vegetables, I asked him to cook vegetables and dal (pulses) in good quantity for me in every meal during my entire stay here, to which he nodded respectfully. Being advised so Chen Singh took excuse to cook food and I proceeded to enjoy long bath with the cool fresh water drawn from the well. What a great relief in feeling the cool water poured over head and body on a hot day, after an arduous jour-

The luxurious bath had raised my appetite several pangs over, causing strong twists in the intes-

#NEW LANDS

tine. Chen Singh was cooking delicious food as was evident from the mouth-watering aroma rising from the open kitchen. Impatiently I was checking my watch: it was minutes past eight that Chen Singh appeared to invite me to the small table where he had laid the freshly prepared food. The dish was aloobyaz curry and a thick hath ki roti, baked on a griddle, placed upside down on an earthen chulha. Impatiently I dipped a piece of roti in the curry and put in the mouth full of saliva. Instantaneously my mouth, stomach and entire digestive system got burnt not with the heat of the food but the chilli, making me cry forgetting all manners. I used water to douse the fire but of no avail. Within seconds my head and face were full of sweat and water started flowing from nose and eyes. Chen Singh rushed to me slipping the half processed bread from his hand, to enquire what had

I shouted at him for putting so much chilli in the vegetable Highly apologetic he brought ghee and poured lots of it in the vegetable to neutralize the chilli effect but this was not ineffective enough. I was dead hungry and could not touch the vegetable so l rolled rotis with the heavy fill of sugar and ghee to douse my stomach fire and left the table with dissatisfaction, after warning Chen Singh not to repeat the experience in the morning. Highly apologetic he swore to use very little chilly in

my food in future Next day early morning he took me to the site. On inspecting the

forest area leased out to the society by the government for bamboo extraction, I found that the extraction work was being done in most unscientific way; bamboo poles were cut not flush to ground but at 12-15 inch height from the ground, thus wasting important forest produce, which would now work as an important apparatus in assisting

Naturally the society was saving labour costs at the cost of invaluable forest. I also found some stacks of bamboo and other timber, brought from outside the lease area. I banged their supervisor and seized these for legal action. I wanted to inspect the areas so effected by such illicit fellings. Chen Singh showed me one such forest, located adjacent to the western boundary of this lease area

table. Impatiently I grabbed the roti and took a mouth full after dip-

food for us, leaving his two men for my assistance. Combing the forest spread over the undulating hills, in search of bamboo clumps and trees subjected to illicit felling was an arduous task, in this hot weather. At 1pm we started returning and reached the naka in an hour's time.

taking several shortcuts. The refreshing ever soothing bath in the cool well water freed me from the excursion fatigue to a great extent but doubled my hunger. Fortunately this time Chen Singh did not take much time in inviting to lunch. The aroma rising appetite had filled my mouth with saliva. It was delighting to find urad ki dal and another vegetable with the nicely baked hath ki roti pasted with ghee, placed on the



ping a huge piece in the dal but I could not even begin to chew it, as just the touch of the stuff on my tongue was good enough to make me emit a loud cry. The chilli had burnt my entire system. Chen Singh ran to me and was shaking before me seeing my pitiable condition with running nose and eyes. I knew from yesterday's experience that water could do no good yet I was taking gulps in frustration. The apologetic guard-cook was trembling in fear before me but how could it help me except controlling my anger to some extent. I again resorted to ghee soaked sweet rolled breads and retired to my room for some rest.

Hyena Sighting

The evening forest inspection was more tedious and I could not spare Chen Singh to cook food therefore he assigned this duty to his trusted assistant Mangala with clear instructions not to use chilli for my food. We collected several evidences of illicit felling of bamboo as well as other tree species like Dhavada (Anogeissuslatifolia), khair (Acassia catechu)-the katthatree, haldu(Adina cordifolia) and khirni (Wrightiatinctoria)-much used for tov making etc.

We were busy in the field exercise till late evening. Now negotiating the undulating hills full of



What a great relief in feeling the cool water poured over head and body on a hot day, after an arduous journey! The luxurious bath had raised my appetite several pangs over.

to grave pangs did not permit a

long bath. Food was already laid on

the table and I rushed to devour it

forgetting morning's chilli experi-

ence, in spite of the familiar aroma

emitting from the vegetable. Also

this time the safety cap was the

instruction already given to

Mangala not to use any chilli in my

food. And hastily I gulped a bit

large piece of the well baked but-

tered bread after dipping in to the

vegetable bowl and instantly my

scream filled the room. Chen Singh

rushed to me with perplexed face;

frightened but more inquisitive to

learn this time what? Water was

dripping from my eyes and nose,

not allowing me to speak out my

my burning mouth. He had wit-

nessed this condition twice earlier

too but then chilli was the main

culprit but this time he had banned

Mangala from using any chilli in

my food; was the chief reason of

A really worried Chen Singh

wanted to know from me the rea-

son for my condition. With great

effort I turned to him. The anger in

my burning eyes was good enough

By Rick Kirkman & Jerry Scott

his confusion.

agony, putting aside hand fanning

shrubs and stumps was making our return pretty difficult for want of had prepared a mashal (torch), wrapping an old rag of cloth and grass on a dry bamboo stick. It was of some help under this faded moon light. He was sharing his anxiety about the fast disappearance of khirni trees, as the species is in high demand in the famous wooden toy industry of this region, for its softness and tool friendliness.

I was absorbed in thinking, I wanted to recommend deputation of at least two addition forest guards on this naka, in my report, suddenly on a turn we encountered a hyena devouring some huge cow like carcass. The animal so disturbed by our sudden intrusion in the midst of its meal, showed its utter displeasure, emitting a fright ening sound. It was so close to our track that we had to immediately back track to evade the possible accident. To our great fortune the stripped animal, imitating a tiger in the faded light, did not run after us albeit it scared us immensely to speed up our pace

It was my first hyena sighting in the wild, quite scary in this unknown jungle to me. It was half past eight when we

reached back the naka. The hunger which had subsided for the time being after the frightening hyena mock charge, had again intensified To our pleasure Mangala was prepared to serve us food but I was dripping with sweat and could not seize the temptation of pouring cool well water over my perspiring oody. It was a heavenly experience after such an exhaustive field trip out the ever rising hunger turning



to shake up the traditionally loyal

staff but I could hardly utter

'chilly', pointing at the vegetable.

And again I got busy in dealing

with my incessant hiccups.

Mangala had also reached us by

then. Now Chen Singh all in rage

staring at him with frightful red

eves, banged him demanding

explanation as to why did he use

chilli in spite of his clear instruc-

tions. The frightened Mangala

with trembling legs and hanging

head, displaying his obedience and

loyalty, opened his mouth and mild-

His reply filled me with fury and

Chen Singh thought it better to

leave me alone for some time. It

took me about ten long minutes to

control the bust of fire, tears and

anger and by that time ghee and

sugar had already been placed by

the lovals. And thus for the third

time I, a voracious vegetable eater,

compromised on rolled sweet bread

did not use any chilli).

Shaping My Career

replied, Hokum! Nakhi Koni(I

ater on Chen Singh _apologetically explained that Mangala is a loyal to hard core and won't dare defying any orders but the fact is that due to shortage of vegetables and pulses in the jungle, they all had become used to eating lot of chilli and it is this practice of several years that they have forgotten to imagine food without chilli.

loyal to hard core and won't dare defying any orders but the fact is that due to shortage of vegetables and pulses in the jungle, they all had become used to eating lot of chilli and it is this practice of several years that they have forgotten to imagine food without chilli. That is why unmindfully his order of no chilly got moderated to less chilli and Mangla's sense of less chilli no different from his guru Chen Singh, resulted in to another repetition of the tragedy. I could very well visualize this

first introduction to the field, was a

promise to me of a thorough trainng during the entire probation period, in all spheres. It pinched those days but later on proved fruitful in bearing the brunt of rough times in the field during the long forest career and with much gratitude I feel indebted to Chen Singh, Mangala and many more alike who knowingly-unknowingly became part of this training apparatus during the probation period. I owe to them a lot for their contribution in shaping my career. My forest career remained full of adventures and thrilling experi ences but that evening meal at Kodiayat and particularly the inno-

o cherish the past Later on Chen Singh apologeti-Concluded cally explained that Mangala is a writetoarbit@rashtradoot.com

cently uttered words, Hokum! Nakhi Koni, by Mangala, have left

permanent imprint on my memory,

feel and cause changes in the brain that are of a similar magnitude as the nicotine in

tobacco products. They are highly reinforcing. They trigger intense urges and

"Of note, there is no biomarkor not." Gearhardt savs.

#FOOD-TALK

Highly Processed Food Are Addictive

The addictive potential for food such as potato chips, cookies, ice cream, and French fries may be a key factor contributing to the high public health costs associated with a food environment



ust like tobacco products, down to these four criteria (which) have stood up to decades highly processed foods can be considered addicof scientific evaluation. Highly tive, researchers report. processed foods meet every single one of these criteria." debated the question for The ability of highly vears as unhealthy diets are often processed foods to rapidly deliver

unnaturally high doses of refined

carbohydrates and fat appear key

products, which contain thou-

sands of chemicals including

report was released more than 30

years ago, tobacco products were

the largest cause of preventable

death. But many people and

products were addictive, it made

us realize that smoking wasn't

just an adult choice, but that peo

ple were getting hooked and

couldn't stop even when they real-

ly wanted to. This same thing

appears to be happening with

When the Surgeon General's

nicotine, Gearhardt says.

to their addictive potential, says To find a resolution, a new analysis took the criteria used in Highly processed foods cona 1988 US Surgeon General's tain complex substances that canreport that established that tobac not be simplified to a single chemco was addictive and applied it to ical agent acting through a specific central mechanism. The same can be said for industrial tobacco

Based on the criteria set for tobacco, the findings indicate that highly processed foods can oe addictive, says lead author Ashley Gearhardt, an associate professor of psychology at the University of Michigan, and Alexandra DiFeliceantonio assistant professor at Virginia

Researchers

fueled by foods loaded with

refined carbohydrates and added

tobacco manufacturers resisted accepting their addictive and In fact, the addictive potential for food such as potato chips, harmful nature. cookies, ice cream, and French "This delayed the implementa fries may be a key factor contion of effective strategies to tributing to the high public address this public health crisis, nealth costs associated with a which cost millions of lives," says food environment dominated by Gearhardt, who directs the cheap, accessible, and heavily University of Michigan's Food and Addiction Science and marketed highly processed foods, Treatment lab. "When we realized tobacco

the researchers sav. The research, published in the iournal Addiction, offers evidence that highly processed foods meet the same criteria used to

identify cigarettes as an addictive substance: They trigger compulsive use where people are unable to quit or cut down (even in the face of life-threatening dis-

eases like diabetes and heart They can change the way we

er in the brain that tells us whether something is addictive "Identifying that tobacco products were addictive really boiled

highly processed foods and this is particularly concerning because kids are a major target of advertising for these products." Poor diets dominated by highly processed foods now contribute to preventable deaths on par with cigarettes. Similar to tobacco products, the food industry designs their highly processed

researchers say.

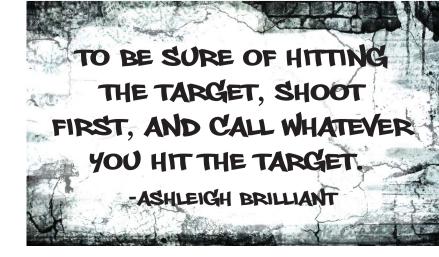
"It is time to stop thinking about highly processed foods just as food, but instead as highly refined substances that can be addictive," DiFeliceantonio says.

foods to be intensely rewarding

and hard to resist, the



THE WALL



BABY BLUES



EW! WREN JUST ATE A BOOGER!



ZITS







By Jerry Scott & Jim Borgman