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Compiled by Science Communication and Dissemination Directorate (SCDD), CSIR, Anusandhan Bhawan, New Delhi

Bhaderwah has emerged as the Lavender capital of India and Agri StartUp destination, says Union Minister Dr Jitendra Singh

CSIR-IIIM

4th June , 2023

It is a moment of pride for all of us...Bhaderwah has emerged as the Lavender capital of India and Agri StartUp destination. This was stated today by Union Minister Dr Jitendra Singh while inaugurating the 2 -day Lavender festival at Bhaderwah in Jammu region.

CSIR- Indian Institute of Integrative Medicine, Jammu has organised the event as part of its One Week One Lab Campaign. Dr Jitendra Singh described Bhaderwah as the birthplace of India's Purple Revolution and the destination of Agri-StartUps.

The Minister said that the valley of Bhaderwah is the best example of development of the present progressive government at the centre which should have been celebrated much earlier, Bhaderwah being the best place for lavender cultivation in terms of land and climate.

Dr. Jitendra Singh while referring to the lavender cultivation in the region, said that Lavender is an avenue of employment generation and research opening many paradigms of development.

The lavender cultivation has changed the lives of many farmers and it is heartening to note that Prime Minister of India, Shri Narendra Modi, in the 99th Edition of Mann ki Baat, appreciated the efforts of the Council of Scientific & Industrial Research- Indian Institute of Integrative Medicine (CSIR-IIIM) in supporting farmers in the cultivation of Lavender in the Bhaderwah, Doda district, J&K under CSIR-Aroma Mission. He said, "Farmers had been engaged in traditional maize cultivation for decades, but some farmers thought of doing something different. They turned to floriculture, that is, the cultivation of flowers. Today, around two and a half thousand farmers are cultivating Lavender here. They have also been handheld through the Aroma Mission of the Central Government. This new cultivation has greatly increased the income of the farmers."

The CSIR-Aroma Mission is a flagship project of CSIR under which Lavender cultivation is being promoted in the temperate regions of J&K. The aim of the project is to increase the income of small and marginal farmers and develop agriculture-based Startups. The project is being directly monitored by Dr. Jitendra Singh, Hon'ble Union Minister of State (IC) of the Ministry of Science & Technology. Under his directions, CSIR-IIIM is implementing Lavender cultivation in Bhaderwah and other parts of J&K.

It is important to mention that over many decades of scientific interventions, the CSIR-IIIM has developed its elite variety (RRL-12) and agrotechnology of Lavender. The variety of Lavender is highly suitable for cultivation in the rainfed temperate regions of India. Under CSIR-Aroma Mission, CSIR-IIIM introduced Lavender and provided more than 30 Lakh free Lavender plants to the farmers of different districts of J&K. The end-to-end technology package for cultivation, processing, value addition, and marketing of the Lavender crop were also provided to the farmers. CSIR-IIIM installed fifty distillation units (45 fixed and five mobile) at different locations across J&K to support farmers in processing their produce.

Many small and marginal maize farmers in the temperate regions of the Jammu division have successfully adopted Lavender. Lavender cultivation has employed large numbers of farmers and young entrepreneurs in the geographically remote regions of J&K. Due to the

intervention of CSIR-IIIM, a new industry around Lavender cultivation has developed in the region. More than 2500 farmers are cultivating Lavender in different parts of J&K. Women are primarily employed in the Lavender fields for harvesting and processing the flower, which has increased women's income in the region. Many young entrepreneurs have started small-scale businesses through the value addition of Lavender oil, hydrosol, and flowers. CSIR-IIIM conducted many skills development programs and trained more than 2500 farmers and young entrepreneurs from J&K on Lavender cultivation, processing, value addition, and marketing.

The net annual income of farmers who switched from maize to Lavender cultivation has increased many folds from around Rs. 40,000/- to Rs. 60,000/- per hectare to Rs. 3,50,000/- to Rs. 6,00,000/- per hectare. Farmers of the Bhaderwah, Doda district, produced 300, 500, 800, and 1500 Litres of Lavender oil in 2019, 2020, 2021, and 2022, respectively. They earned > Rs. 5.0 Crore between 2018-2022 by selling dry flowers, Lavender plants, and Lavender oil. The successful end-to-end technology transfer on the cultivation of Lavender to the farmers of J&K by CSIR-IIIM, Jammu, under Aroma Mission has been widely covered nationally and internationally by print and electronic media. The media has recognized this initiative of CSIR-IIIM as the "Purple Revolution." CSIR-IIIM received the CSIR award for S&T innovations for rural development (CAIRD- 2020) for Purple Revolution in Jammu & Kashmir: Rural Development Through Lavender Cultivation in J&K.

Prominent among many others present were Dr. D Srinivasa Reddy, Director, CSIR-IICT, Dr. Zabeer Ahmed, Director, CSIR-IIIM, Jammu, Dhanetar Singh, DDC Chairman, Doda, Sangeeta Rani Bhagat, DDC Vice Chairman, Doda, Vishesh Paul Mahajan, Deputy Commissioner Doda.

Published in:

Pib

CSIR-National Physical Laboratory celebrates World Environment Day 2023

CSIR-NPL

5th June , 2023

CSIR-National Physical Laboratory, organized and celebrated the World Environment Day (WED) 2023 on 5th June, 2023 under JIGYASA CSIR flagship program.

WED is held annually on 5 June which brings together millions of people from across the globe and engage them in the efforts to protect and restore the Earth. This year marks the event's 50th anniversary. People from more than 150 countries participate in this United Nations international day that celebrates environmental action and the power of governments, businesses and individuals to create a more sustainable world. WED has been led by the United Nations Environment Programme (UNEP) since its inception in 1973. This year the theme of WED is "Solutions to plastic pollution".

Scientists, Staff and Research Scholars of the Division "Environmental Sciences & Biomedical Metrology" of CSIR-NPL celebrated this day along with school students and teachers under Jigyasa program where 100 children and 12 teachers from six different Delhi NCR schools namely, The Divine Mother International School (UP), Allen House Public School (Ghaziabad), Aster Public School (Noida Ext. UP), Shaheed Bishan Singh Memorial Sr. Sec. School (Kirti Nagar, Delhi), Balvantray Mehta Vidya Bhawan Anguridevi Sher Singh Academy (GK-II , Delhi) and Presidium School (Indirapuram, UP) took part in the celebration.

Jigyasa, CSIR's flagship programme, is an educational project designed to inspire schoolchildren to pursue scientific careers. At CSIR-NPL, the Jigyasa programme places a strong emphasis on close relationships between students and scientists, which acts as a spark to promote an atmosphere of curiosity and foster a scientific temperament in students. Laboratory visits, experimental demonstrations, well-attended lectures, practical demonstrations, summer projects, micro-research activities, teacher training, and other

activities are all included in interaction programmes. The program started with the welcome address by Dr Jiji Pulikkotil followed by the address by the acting Director CSIR-NPL, Dr Sanjay R. Dhakate and Head of Environmental Sciences and Biomedical Metrology Division, Dr T. K. Mandal. Dr Mandal emphasized the pollution in various facets of the environment and the consequences the mother Earth is facing while Dr Dakate sensitized the audience about the seriousness about the plastic pollution which is contaminating the whole ecosystem. The inaugural session was concluded with vote of thanks by Dr Sumit Kumar Mishra.

The four interesting Lectures were delivered by the subject experts followed with quiz, laboratory visits after the inauguration.

The first lecture was delivered by Dr. Sachchidanand Singh told that “Climate Change has always been a part of life on the Earth due to several natural factors like Plate Tectonics movement, Variation in Earth's orbit, Volcanic Activities etc. and human induced reasons like large scale fire, overgrazing etc”. Dr Singh added that “the most worrying aspect is the recent speed of accelerated growth in Green House Gas (GHG) concentration and Atmospheric Aerosols due to anthropogenic activities, particularly after the Industrial Revolution”. He said that the CO2 level has increased by more than 45% after 1850 and the consequences are alarming and the Global Warming is no longer a prediction but it is happening, it is real and being felt by the present generation. He concluded his talk with the statement that “It is the duty of all of us to do something to contain the present speed of increase in GHG and Aerosols in the environment to save the Earth from further degradation”

The other speaker, Dr. Monika J. Kulshrestha spoke about ‘Environmental Impacts.’ She gave an overview of human activities affecting the environment adversely. She further told the students how each individual can take responsibility for making a difference in the environment. She also explained to the students the importance of atmospheric chemistry research and its direct relevance in the Indian scenario while comparing it with global.

Another speaker, Dr. Shankar talked about international scenarios of national metrology

institutes starting from meter convention to BIPM and to NPL role in disseminate SI traceability. He also talked about air quality measurements and different parameters of it. This year as the theme of the world environmental day is to "beat plastic pollution", he also showed the recent results of their research on which they found tracer for plastic pollution in air. At last, he said that let's decide today that when we celebrate century year of our independence we will have plastic fee environment, for which we need to find societal and scientific solutions, and it is a collective responsibility of all of us.

The last speaker, Dr. Rupesh M. Das apprised about the importance of Antarctica and Indian scientific activities related to environmental investigations. He also elaborated the possible climate change impact on the ice covered continent and its consequences to the other regions.

The program ended with the felicitation of the quiz winners.

Published in:
Pib

CSIR-Indian Institute of Petroleum, Dehradun, celebrates World Environment Day

CSIR-IIP

5th June , 2023

CSIR-Indian Institute of Petroleum, Dehradun, celebrated World Environment Day on 5th June 2023. The theme of the function was "Preventing Plastic Pollution".

The Chief Guest of the event was Sh. Anoop Nautiyal, Founder of the Social Development for Communities (SDC) Foundation, Uttarakhand. The program was initiated with the warm welcome of the Chief Guest by the Director CSIR-IIP. Dr G D Thakre, Sr Principal Scientist, presented World Environment Day's brief outline and background.

In his welcome address, Prof. R Pradeep Kumar Director, CSIR-IIP, emphasized the importance of climate change and the significance of Energy demand and supply in the Nation. He also informed the gathering that we need to utilize our resources judiciously, as they won't be available to us again once replenished.

Sh. Anoop Nautiyal, the Chief Guest of the function, delivered the World Environment Day Lecture on "The Perils of Plastic Waste". Shri Nautiyal informed the audience that nobody is 100 per cent perfect, but we can try to change our habits and minimize the use of single-use plastic in our homes. He also stated that it is our collective social responsibility to encourage and educate youngsters, family and friends to restrict and minimize the use of plastics in our day-to-day life.

Dr Sunil Pathak, Senior Principal Scientist, enlightened the gathering by providing

information on the Climate Clock and its significance. Climate change is a big challenge in front of the world. The Energy Swaraj Foundation (ESF), in collaboration with the government's Atal Innovation Mission, is keen to spread awareness about climate change among the common masses. A climate clock, alarming people about the time left for the average global temperature rise to hit the 1.5 degrees Celsius mark, is all set to be displayed. On the occasion of Worl Environment Day, a climate clock was unveiled by the dignitaries on the dais in the presence of the august audience. This clock revealed that we are just 6 years, 47 days and 10 hours behind when the earth's temperature will increase by 1.5°C. The event concluded with a Vote of Thanks by Shri Anjum Sharma, Senior Controller of Administration.

Published in:

Pib

Plans afoot to make CFTRI 'zero-waste' campus, says Director

CSIR-CFTRI

5th June , 2023

CSIR-CFTRI Director Sridevi Annapurna Singh on Monday, June 5, said that efforts are on to make the sprawling institute a "zero-waste campus" and develop alternatives to plastics for food-packaging as food industry contributes a lot to plastic pollution and climate change.

Presiding over the World Environment Day celebrations on the campus, she said the food industry uses a lot of plastic for packaging foods. "We have shifted our focus on developing biodegradable packaging for foods for minimizing the threat of plastic on the environment."

She said 400 million tonnes of plastic was used annually the world over and half of it is single use plastic. Nearly 18 to 20 million tonnes of plastic goes into the ocean, causing pollution. "A human being indirectly consumes nearly 20 kg of micro plastics in his or her lifetime because of the rampant use of plastic in food packaging. This poses a threat to health and results in hormonal imbalance," she cautioned.

"Plastic is primarily used to improve shelf life. When life is being threatened due to use of plastic, what's the need to improve the shelf-life of our products," she wondered.

She said the CSIR-CFTRI campus has a large tree cover which makes the campus cooler, with temperature lesser by around 2 to 3 degrees when compared to the temperature outside the campus because of vast greenery.

Filmmaker and Environmentalist Suresh Heblikar, who was the chief guest, planted a sapling on the campus marking the occasion. He advised the people to plant trees and take good care of them for the future generations.

Published in:
The Hindu

CSIR-IITR Pre-Monsoon Report 2023: Pollution in Lucknow down from last year but still above NAAQ standard

CSIR-IITR

4th June , 2023

LUCKNOW Air pollution levels in Lucknow have decreased to some extent in comparison to the previous year but the concentration of pollutants is still higher than the prescribed limit set by National Ambient Air Quality Standard (NAAQS). The revelation has been made in annual report -- 'Assessment of Ambient Air Quality of Lucknow City-Pre-Monsoon 2023' -- compiled by the environmental monitoring division of CSIR-Indian Institute of Toxicology Research (IITR), Lucknow.

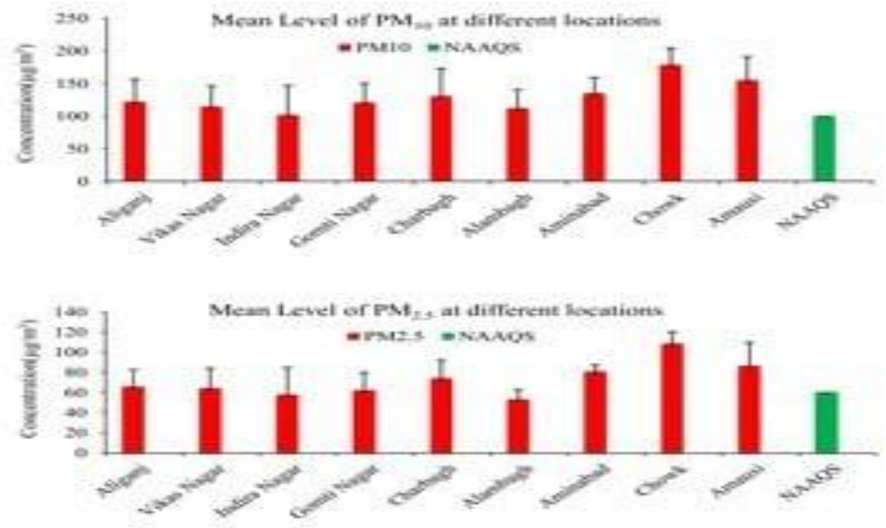

Figure 2: Concentration (µg/m³) of PM_{10} and $PM_{2.5}$ in different areas of Lucknow city during Pre-monsoon Season (2023) compared with prescribed National Ambient Air Quality Standard (NAAQS)

The report, which assesses nine areas of the city, was released on Sunday, the eve of World Environment Day. It adds that Aliganj is the most polluted among residential areas -- including Vikas Nagar, Gomti Nagar and Indira Nagar. Similarly, Chowk has the highest concentration of PM2.5 and PM10 among commercial areas -- including Aminabad, Charbagh, and Alambagh. The air quality was found to be exceeding NAAQS limit in industrial areas like Amausi as well.

The report further adds that Gomti Nagar and Alambagh are the noisiest areas of Lucknow.

All areas breach national standard

In a worrying revelation, the IITR report discloses that pollutants -- like PM2.5 and PM10 -- breach the national standard in all assessed areas of Lucknow. However, other pollutants -- like Sulphur Dioxide and Nitrogen Dioxide -- were found below the NAAQS limit.

Among all monitoring sites in Lucknow, the average concentration of PM10 was found 30% higher than NAAQS limit of 100 micrograms per cubic metre while the average concentration of PM2.5 was 21% higher than prescribed NAAQS limit of 60 micrograms per cubic metre.

Pollution levels still better than last year

Nonetheless, pollution levels during pre-monsoon 2023 are still lower than pre-monsoon 2022. PM10 levels in residential, commercial and industrial sites have decreased by 11.8%, 20.3%, and 18.1% respectively. Likewise, PM2.5 levels have decreased by 12.6%, 27.8%. 17.4% in residential, commercial and industrial sites. Besides, the levels of Sulphur Dioxide and Nitrogen Dioxide have also decreased by 6.5% and 11.5% respectively in the city during the aforementioned period.

As per the report, the reason behind the drop may be scattered rainfall during the study period that influenced the suppression of the ground-level dust and settled down the suspended particles in the atmosphere. The rainy days also controlled vehicle movement and construction activities, which contribute the most to air pollution in Lucknow.

Gomti Nagar, Alambagh, & Charbagh among the noisiest

Although air pollution decreased from the previous year, noise pollution increased significantly from the previous year in all residential, commercial, and industrial areas, both during the day and at night. In fact, the noise pollution level also breaches the standards set by the Central Pollution Control Board.

In all the four residential areas -- including Gomti Nagar, Indira Nagar, Vikas Nagar and Aliganj -- Gomti Nagar turned out to be the noisiest with high decibels (dB) both during day (67.6) and night (75) as compared to set standard of 55 dB (day) and 45dB (night).

Likewise, among the commercial areas -- including Alambagh, Aminabad, Charbagh, and Chowk -- Alambagh turned out to be noisiest during day time recording an average of 80.6 dB, breaching the set standard of 65dB during the day time. Meanwhile, Charbagh turned out

to be the noisiest at night with an average of 78.9 dB as compared to set 55 dB during night. Industrial areas like Amausi also saw a slight increase in its decibel levels.

MAJOR SOURCE OF AIR POLLUTION IN LUCKNOW

Old building demolition.
Excavation for new construction.
Unpaved and damaged roads.
Garbage and waste dumps.

WHAT CHANGED IN ONE YEAR

A 6.3% increase in total number of vehicles -- from 26,50,286 in 2021-22 to 28,12,737 in 2022-23.
Consumption of petrol, diesel, and CNG increased to 23.7%, 24.9% and 22.2% respectively.
LPG consumption decreased by 32.4%.

Published in:
Hindustantimes

Genetic Diversity of Primates and Implications for Conservation

CSIR-CCMB

3rd June , 2023

Scientists from the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad have conducted two new studies that have produced vital insights into the genetic variety of primates and their evolution. These findings have implications for understanding and protecting biodiversity, particularly in closely related species to humans. The scientists used genome sequencing techniques to analyse over 800 individuals from 233 primate species, including 83 samples from 19 main primate species researched by CCMB experts in India. They discovered 4.3 million common missense mutations, which are genetic changes that can affect the makeup of amino acids and potentially alter protein function. These mutations have ramifications for a wide range of human disorders.

The international research was led by prominent organisations such as the Institute of Evolutionary Biology, Pompeu Fabra University, Illumina, and Baylor College of Medicine, with CCMB serving as the Indian collaborator. In June, the findings of the study were published in the prominent journal Science. The paper contains the most comprehensive database of primate genomic information to date, spanning over half of all primate species on the planet.

The data set contains data on primates from a variety of regions, including Asia, America, Africa, and Madagascar. This invaluable resource has enabled scientists to compare genomes and obtain a better knowledge of primatology's evolutionary history, providing crucial insights into what distinguishes humans.

Dr. Govindhaswamy Umapathy, senior principle scientist at the CCMB, emphasised the significant genetic diversity identified across monkeys across geographical locations and taxonomies. The study of this diversity is critical for understanding human evolution, understanding human diseases, and conserving these species for the future.

The study also discovered that the western hoolock gibbon, India's lone ape species, as well as lion-tailed macaques from northeastern India and the Western Ghats, had lower genetic diversity than the other primates studied. Dr. Umapathy emphasised the importance of prioritising conservation efforts for these primates in India, citing the findings as useful insights into the species in need of immediate conservation measures.

Dr. Vinay Kumar Nandicoori, Director of CSIR-CCMB, remarked that these research provide significant information on the primates that require the most conservation efforts. The findings may aid in the development of effective conservation strategies for these species, thereby ensuring their long-term existence.

Published in:
Ythisnews

NIIST to inaugurate treatment unit for recycling greywater

CSIR-NIIST

3rd June , 2023

Researchers at the Environmental Technology Division of the CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) here have developed a bio-eco engineering system for treating greywater.

NIIST is opening a model treatment unit on its campus for treating and recycling greywater from the staff quarters on June 5, in connection with the Environment Day celebrations.

The NIIST system consisted of a modular anaerobic treatment unit (microbial process) integrated into a planted filter bed (Phytoremediation unit) for treating different types of greywater, NIIST said in a statement. The anaerobic treatment unit was a patented design from NIIST. Nearly 50% of the contaminants in the greywater would be removed in the anaerobic treatment system.

Jyotiranjan S. Ray, Director, National Centre for Earth Science Studies (NCESS), will inaugurate the model treatment unit at NIIST. NIIST director C. Anandharamakrishnan will be present. Household wastewater except for the toilet flush-out (black water) constitutes greywater. The daily release of greywater from a normal five-member family will be around 500 litres.

Unlike existing decentralised treatment systems, the NIIST technology could handle high-strength greywater also, the statement said. Depending on the reuse application of treated

water and space availability, the anaerobically treated water could be either passed through the planted filter bed or through a compact aerobic microbial process unit for producing reuse quality water.

Integrating the anaerobic process unit would reduce nearly 30-40% of space requirement compared to conventional phytoremediation (planted gravel bed) systems, NIIST said. NIIST also plans to replicate this treatment system in residential areas and commercial spaces for treating greywater in a sustainable way and ensuring better sanitation conditions.

Published in:
The Hindu

CSIR-IITR's new device offers hope for fighting air pollution

CSIR-IITR, NEERI

3rd June , 2023

Lucknow: The CSIR-Indian Institute of Toxicology Research (IITR) is working on a hi-tech device to help reduce the concentration of ambient air pollution, more effectively than anti-smog guns and smog towers that are currently used.

What makes the device unique is that it will not only clean air by reducing PM10 and PM2.5 concentrations but will also reduce gaseous pollutants from the air, a feature that is unavailable in the present ambient air pollution reduction devices.

The institute has already made the design and technology of the device with the help of a grant of Rs 34.79 lakh given by the DST-Science and Research Engineering Board (SERB) for the project. The technology has now been given to an external agency to fabricate the device.

Dr B Sreekanth, the brain behind the design and development of this device, scientist and assistant professor of environmental monitoring division, CSIR-IITR, who is the project investigator, said, "A few recent ambient air purification devices like WAYU of CSIR-NEERI and Smog-Tower of IIT Bombay are facing challenges at the field evaluation stage due to their huge size, power requirements and maintenance. However, there is a demand for competent and upgraded device-technology solutions for improved air quality. Hence CSIR-IITR is making a new one."

He said the institute has been conducting air pollution monitoring at nine locations in Lucknow since 1997 and has also been involved in various national policies and standardisations for air pollution management.

He said, "The proposed device technology is designed for 1,000 cubic metre per hour (m3/hr)

intake of ambient airflow and computational simulations found that the design of the device reduced concentration of fine particulate matters (like PM10 and PM2.5) up to 80 per cent and gaseous pollutants (like SO2 and NO2) up to 60 per cent."

He said the device technology also oxidises the concentration of other critical pollutants in the breathing air like carbon monoxide, hydrocarbon, and volatile organic compounds.

Published in:
Bizzbuzz

CSIR-NIIST

2nd June, 2023

Eco-friendly solutions
(Clockwise) Edible straws from Thooshan, biodegradable plates from Qudrat; Vinaykumar Balakrishnan.
SPECIAL ARRANGEMENT

Finish your plate and eat it

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Ahead of World Environment Day on June 5, a look at the boom in biodegradable tableware made from agricultural residue

How about a tall glass of iced pineapple juice and a flavoured straw as an appetiser? Thanks to edible tableware and biodegradable containers made from agro-residue, you might be able to eat from a plate and then the plate as well. Cups made from rice bran, rice husk and rice straw, plates and takeaway containers made of apple prunes and pineapple leaves are just some of the options open to those who want to say no to single-use plastics.

Rice husk, bran and straw, wheat bran, pineapple waste, apple prunes, banana waste and the like are getting converted into single-use, compostable biodegradable products.

For instance, Qudrat, an eco-friendly tableware brand, operating from KINFRA in Thiruvananthapuram, makes biodegradable plates from rice husk, rice bran and rice straw, non-edible straws made of coconut leaves, edible straws in five flavours and spoons in two flavours. Biodegradable plates with compartments, tumblers and bowls are next in line.

At Thooshan, a biodegradable tableware brand based at Angamaly near Kochi, the product range includes plates made of wheat bran, and edible straws made of rice flour. Their latest product is cake base boards from wheat bran. By July, the brand will have cutlery and container boxes that use rice bran as the raw material.

In demand

"Companies are keen on manufacturing sustainable, eco-friendly tableware and we have been getting enquiries from across the country," says C Anandharamakrishnan, director of the National Institute for Interdisciplinary Science and Technology (NIIST), at Pappanamcode in Thiruvananthapuram. NIIST, which comes under the Council of Scientific and Industrial Research (CSIR) laboratory, has been providing the technology to those interested in manufacturing biodegradable products since 2018. "We provide the technology and the companies do the research and development according to their need," Anandharamakrishnan adds.

CSIR-NIIST has handed over the technology to 14 firms, including Thooshan and Qudrat. "Rice and wheat processing mills produce a lot of agri-waste. While Himachal Pradesh has to deal with apple prunes, in Madhya Pradesh waste is generated during processing of pulses," says Anjineyulu Kothakota, scientist with CSIR-NIIST.

According to Vinaykumar Balakrishnan, founder of Thooshan, which started operations in 2021, demand is going up for biodegradable plates and cutlery. "It was an achievement when our plates and straws were used at the G20 Sherpa meet at Kumarakom in March 2023. The straws are made from broken rice that is generated during rice milling. The mills usually sell them to liquor companies. However, we managed to convince some of the owners in Andhra Pradesh to hand it over to us and that's how we started working on this product. Tapioca or corn starch is used as the binding agent. In addition to standard straws, there are jumbo straws, cocktail straws and straws for use in cartons," he says.

In the case of Rishab Suri, CEO and co-founder of Qudrat, it was a plan to diversify from their core business of automobiles that made him try his hand at biodegradable cutlery. "We wanted to focus on a field that will emerge as a primary sector in future. That's when we combined sustainability, clean technology and agriculture in the area of biodegradable tableware," he explains.

He adds that the demand for such tableware is from the hospitality sector, aggregators and religious places. "We get more traction from metros such as Mumbai, Bengaluru, and Delhi. Now that we are available on Amazon, we are getting orders from Mizoram and Nagaland too. We hope to make it available in the US market soon," says Rishab.

Anandharamakrishnan says CSIR-NIIST is looking at making edible and non-edible cutlery from millets and millet waste. The Institute has used banana and pineapple waste to manufacture samples of garden pots. It has also set up a biodegradable testing centre for end-to-end testing of products.

"It's time we change the way we think about waste," Vinaykumar asserts.

Going green

- Companies that have bought the technology from CSIR-NIIST are based in Himachal Pradesh (Himjoy), Punjab (Biochoice), Gujarat (Unigreen), Karnataka (BM Impex), Tamil Nadu (Ecosmart), and Sungod Agfarms (Maharashtra). Vazhakulam Agro And Fruit Processing Co. Ltd (VAFPCL) at Muvattupuzha in Ernakulam district, which is into commercial processing of fruits, predominantly pineapple, has taken the technology to manufacture biodegradable products from pineapple waste, especially leaves. The Institute has also associated with the ITC group.

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