

# CSIR IN MEDIA



**CSIR**

## **NEWS BULLETIN 26 TO 30 APRIL 2021**





## MSME DI, Cuttack conducts webinar on Oxygen Enrichment Unit developed by CSIR-CMERI

CSIR-CMERI

30<sup>th</sup> April, 2021

In a series of webinars for dissemination of awareness on the Oxygen Enrichment Unit developed by CSIR-CMERI to the MSMEs and other entrepreneurs, MSME DI, Cuttack conducted a webinar on 30.04.2021 amidst the crisis of Oxygen. Prof. (Dr.) Harish Hirani, Director, CSIR-CMERI delivered the key address in the seminar. Mr Pawan Gupta, Director, MSME,



Cuttack and Mr S. K. Sahu, Asstt. Director also participated in the above webinar together with participating a number of MSMEs, Entrepreneurs and Startups across the Odisha region.

Prof. Harish Hirani, Director, CSIR-CMERI, while interacting with the MSME representatives shared that the MSMEs of the Nation will be playing a decisive factor in tackling the COVID 19 battle. COVID may impair the lungs to a great extent and this impairment can be rectified by Oxygen Therapy. To properly tackle and control the Oxygen crisis, the CSIR-CMERI developed Oxygen Enrichment Unit (OEU) can provide a veritable solution. Besides, even in a Post-COVID scenario, the Oxygen Enrichment Units can be a game-changer for ailing aged persons as well as Therapeutic Usage of Oxygen, because it helps in detoxification. Since the OEU might be the essential equipment of the future, the Cost of the device needs to be optimised and indigenised manufacturing needs to be boosted. The CSIR-CMERI OEU has been developed with a Simple Architecture and Design Philosophy built with easily available Raw Materials. If innovatively used by the MSMEs, a Single Air Compressor strategically placed outside the room can help serve 4-6 patients at one go. The technology can also be customised as per the requirements of the situation.



CSIR-CMERI commits to provide all sorts of assistance to the MSME partners in terms of Technical Training and Raw Materials sourcing. A virtual meeting would also be arranged post Technology Transfer for Maintenance and Trouble Shooting. The Royalty of 6% may also be completely waived off, keeping in mind the COVID situation, if applied by the concerned MSME.

Mr Gupta, Director, MSME, DI, Cuttack hoped that the country's dependency would definitely come down considerably with the development of the Oxygen Enrichment Unit by CSIR-CMERI. He made a call to all the MSMEs and entrepreneurs to take advantage of the technology of the device from the Institute. He also requested CSIR-CMERI to come forward and share more and more Institute developed technologies with them for its wider dissemination to the entrepreneurs which may help into employment generation as well as import substitution and above all for the benefits of the common men.

Mr S. K. Sahu, Asstt. Director, MSME, DI, Cuttack welcoming all the participants in the webinar expressed that he appreciates the commendable efforts of CSIR-CMERI for developing such a miniature device which is presently required at every household. He also assured that MSME, Cuttack would provide every possible support to the MSEs and entrepreneurs through the available avenues of the Government of India schemes for the entrepreneurs.

All the MSMEs and other entrepreneurs attending the webinar were keenly interested in the CSIR-CMERI developed OEU and were eager to know the detail of the technology, its cost aspects, capital and finance required to start production, statutory requirement towards testing of the technology, how to start up the fabrication immediately, their prospective competition from the large businesses etc. Director, CSIR-CMERI and Director, MSME DI, Cuttack provided their guidance to these queries and assured further support to the prospective entrepreneurs in their endeavors.

**Published in:**

[Devdiscourse](#)



# COVID WARRIORS – Two Labs: One Mission

CSIR-CCMB, CFTRI

30<sup>th</sup> April, 2021





The importance of Laboratory was understood when the deadly COVID-19 pandemic struck the whole world. In India, where healthcare facilities are still in primary stage, this contagion came as a rude shock. People came to know about the important role of a laboratory as every swab sample collected was tested before certifying whether the patient is positive or negative.

In Mysuru too, the Government Laboratories were not designed to handle testing of an invisible virus but it worked swiftly in this direction by setting up two Labs to test the samples and give quick results. At present, Mysuru has three COVID-19 Testing Labs — One at the Microbiology Department (on the premises of K.R. Hospital) in Mysore Medical College and Research Institute (MMC&RI); second one at JSS Hospital and the third is the CSIR-CFTRI Testing Centre. Today, SOM features the two public institutions that have been providing services to the public free of cost since the outbreak. —Ed

### **Mysore Medical College and Research Institute**

They have forgotten what leave or weekly off means as they are working without it for almost a year except for a brief period in February this year. The working hours of these staff members go beyond 12 hours with or without break.

This is the story of Corona Warriors at Mysore Medical College and Research Institute (MMC&RI) RT-PCR Testing Lab which is functioning 24×7 since the outbreak of COVID-19 in March last year. Understanding the importance of test result they give, a team of doctors and technical staff under the leadership of Dr. Amruthakumari, Nodal Officer, MMC&RI Laboratory, they have been working day and night racing against time.

“From March 2020 till March 2021, we have tested 5,60,000 samples with an average of 3,000 to 3,500 tests a day,” Dr. Amruthakumari told SOM. She said the Lab works in four shifts including general shift from 9 am to 5 pm. Timing of three other shifts is: 7 am to 2 pm, 2 pm to 9 pm and from 4 pm till the day’s work ends.



Their work has increased ever since the unprecedented increase in Corona positive cases now. The number of testing has gone up to 3,500 samples daily due to testing of primary and secondary contacts of positive patients. The small team of dedicated staff has been handling the maximum number of samples daily to give test results within the mandated 24 hours.

“We have five teams within the laboratory — sample receiving team, extraction team, RT-PCR team, reporting team and data entry team. Once test result comes, it has to be uploaded to ICMR portal immediately. We were relaxed little bit in February this year with the positive cases hitting rock bottom. But after the spike in cases, our work has doubled. The laboratory receives around 4,000 to 4,500 samples collected from throughout the district but we can test only around 3,500 samples as the machinery does not have the capacity to handle more,” she said.

Dr. Amruthakumari said they were well aware as to how people will be tensed till they get RT-PCR report. Understanding their emotions, the lab staff are working beyond their time limit. MMC&RI Dean and Director Dr. C.P. Nanjaraj said, “I am very proud about my team of doctors and technicians who are working day and night. Some data operators have gone on quarantine. Those who have been taken as stop-gap arrangement are given three to four days of training, before putting them on job.”

### **CSIR-CFTRI COVID Testing Centre**

To deal with RT-PCR test samples from Taluks and other Centres, another laboratory, CSIR-CFTRI COVID-19 Testing Centre was set up at the Government Ayurveda Hi-Tech Panchakarma Hospital at Brindavan Extension (KRS Road) in city.

It was done as per the directions from Dr. Shekhar C. Mande, DG-CSIR, Dr. KSMS Raghavrao, former CFTRI Director and Dr. Sridevi Annapurna Singh, the current CFTRI Director, to support the District Administration and the State Government in fighting the Covid-19 pandemic.



Dr. Prakash M. Halami is the Coordinator and Dr. P.V. Ravindra is the In-Charge Coordinator-cum-Lab-In-Charge. So far, this Centre has crossed the testing of 2,20,000 Covid-19 samples, a remarkable achievement since its inception in August last year. The Centre receives samples from TB and District Hospital, KR Nagar, Hunsur and Periyapatna taluks. This Centre consistently tests around 2,000 samples per day with the support of two RT-PCR machines and one RNA extractor.

### **DC promises more staff**

Speaking to SOM, Dr. Ravindra said “Earlier we were testing by pooling of samples, but with the increase in positivity rate more than 5 percent, testing is done for each sample that amounts to almost 2,000 reactions per day. This will be a burden on both machines as well as the workforce. In this direction, Deputy Commissioner (DC) Rohini Sindhuri has agreed to provide more human resources to strengthen our Centre. And District Health Officer (DHO) Dr. T. Amarnath also has deputed additional Data Entry Operators (DEOs) to our Centre. We have also requested the State to provide us one more RNA extractor and the RT-PCR machine to strengthen our Centre to handle more tests.”

### **Dry swab method**

He said “We also plan to introduce ICMR approved, CSIR-CCMB developed, ‘dry swab method.’ This method has the advantage of doing direct PCR without RNA extraction. This will save a lot of consumables, time and as well as funds. We can also ramp up the testing numbers.”

### **Less salary**

“The primary issue we are facing is the salary for lab technicians, who get only Rs. 10,000 per month with a lot of risks involved, especially with an increased positivity rate. Further, deputed people also have to work at both places without remuneration. I request that the salary for technicians may be increased and deputed personnel may be provided with suitable remuneration. Also, the technicians may be provided with travel assistance, especially during his curfew period,” he noted.



Meanwhile, Dr. Ravindra has expressed his gratitude to the DG-CSIR, CSIR-CFTRI Director, RBI-Mysuru branch, District Administration and the State Government for supporting the CFTRI Testing Centre financially and also for providing them an opportunity to serve the public during this Covid-19 pandemic.



## Indo-German project 'Pyrasol' to transform Urban organic wastes into biochar and energy in smart cities

CSIR-CLRI

30<sup>th</sup> April, 2021

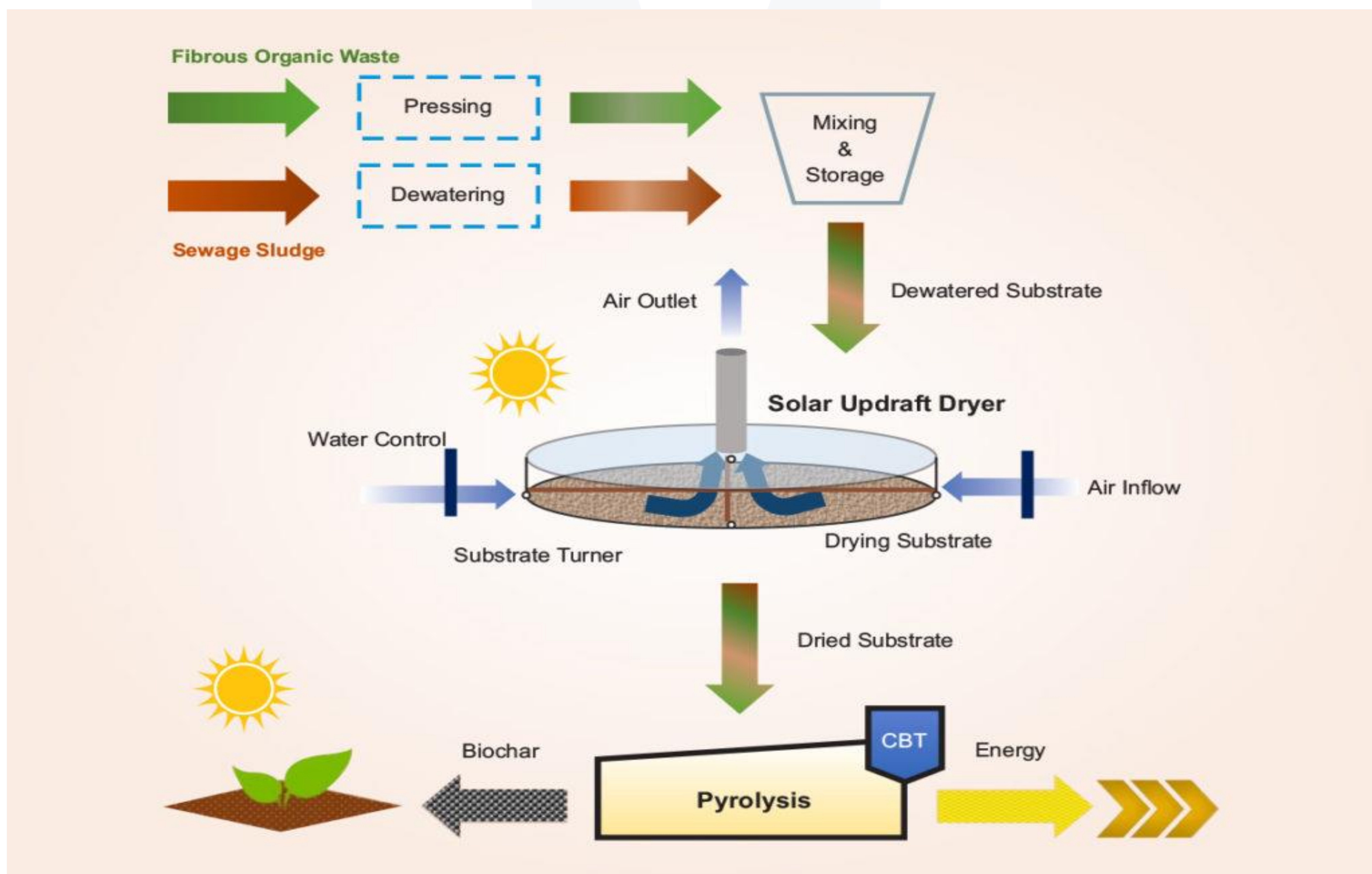


Chennai has recently outshined the other smart cities of India and emerged as a role model for sustainability. It is one of the most populous cities in India harboring over 8.5 million inhabitants and subsequently generating approx. 5,200 tons of Municipal sewage wastes (MSW) per day. It is one of India's first 20 Smart Cities to nurture an innovation in managing its waste effectively and undertake and extensive wastewater treatment, as a pioneer for entire gamut of Indian metropolitan cities.

The Integrated Solar Dryer and Pyrolysis pilot has been inaugurated by Dr. K J Sreeram, Director, CSIR- Central Leather Research Institute (CLRI), Chennai, that strives to offer an innovative approach for smart cities to transform their urban untreated organic waste into biochar and clean form of Energy.

Therefore, Pyrasol stands for Pyrolysis and Solar systems integrated in a single package.





### Lessons from a wasteful market:

A prior analysis made at the local fruits-vegetables market, known to generate about 3.5% of wastes out of entire city's, found that there were left-off nutrients and fibers in the wastes those could be utilized to trigger energy.

The banana peduncles comprise with 32.5 % lignin and 24.5 % hemicellulose (based on dry matter) a high share of slowly degrading fibers. Vegetable and fruit wastes contain 17.5 % and 17.2 % lignin respectively.



### **Indo-German classic collaboration: Involved Parties**

With greater emphasis on Industrial participation, applied research and technology advancement, the project was rendered to CSIR-CLRI(Council of Scientific and Industrial Research) by the Indo-German Science & Technology Centre (IGSTC).

IGSTC has been established by the Department of Science & Technology (DST), Govt. of India & Federal Ministry of Education and Research (BMBF), Govt. of Germany in collaboration.

### **Targets to the Mission:**

The mission focuses on managing and streamlining the collection, segregation, treatment, and disposal systems of urban wastes in Indian Smart Cities as well as other urban centres on their path to Sustainability.

It aims to develop Technology needed for the joint processing of Fibrous Organic Waste (FOW) and Sewage Sludge (SS) of Indian smart cities into highly valuable biochar associated with energy recovery, carbon sequestration and environmental conservation.

Through the Pyrasol project, simple and robust processing techniques for abandoned organic waste will be further developed to improve sanitation and welfare, supply regenerative energy, convert waste into products and reduce the carbon footprint of smart cities.

It does so by an innovative organic waste drying system using the solar natural chimney effect followed by a highly efficient single-chamber pyrolysis.

**In upcoming 10 years, it is estimated that Chennai would possibly generate approx. 1.7 million m<sup>3</sup> of sewage per day.** It is to note that entire city of Chennai is connected to a sewer system.



In the Indian Urban areas, approx. only 30% liquid waste is treated on an average, before its discharge in the larger waters. On the other hand, any suspended solids and BOD of 300 mg/L and 150 mg/L in the inlet of sewage, about 250 tons per day of dewatered sludge from STP is generated and disposed in dumping sites. This called for an urgent need of injecting modern and scientific methods for FOW and sewage sludge treatment for Indian urban areas like Chennai, which also corresponds to the main objectives of the Government of India's Swachh Bharat Mission.



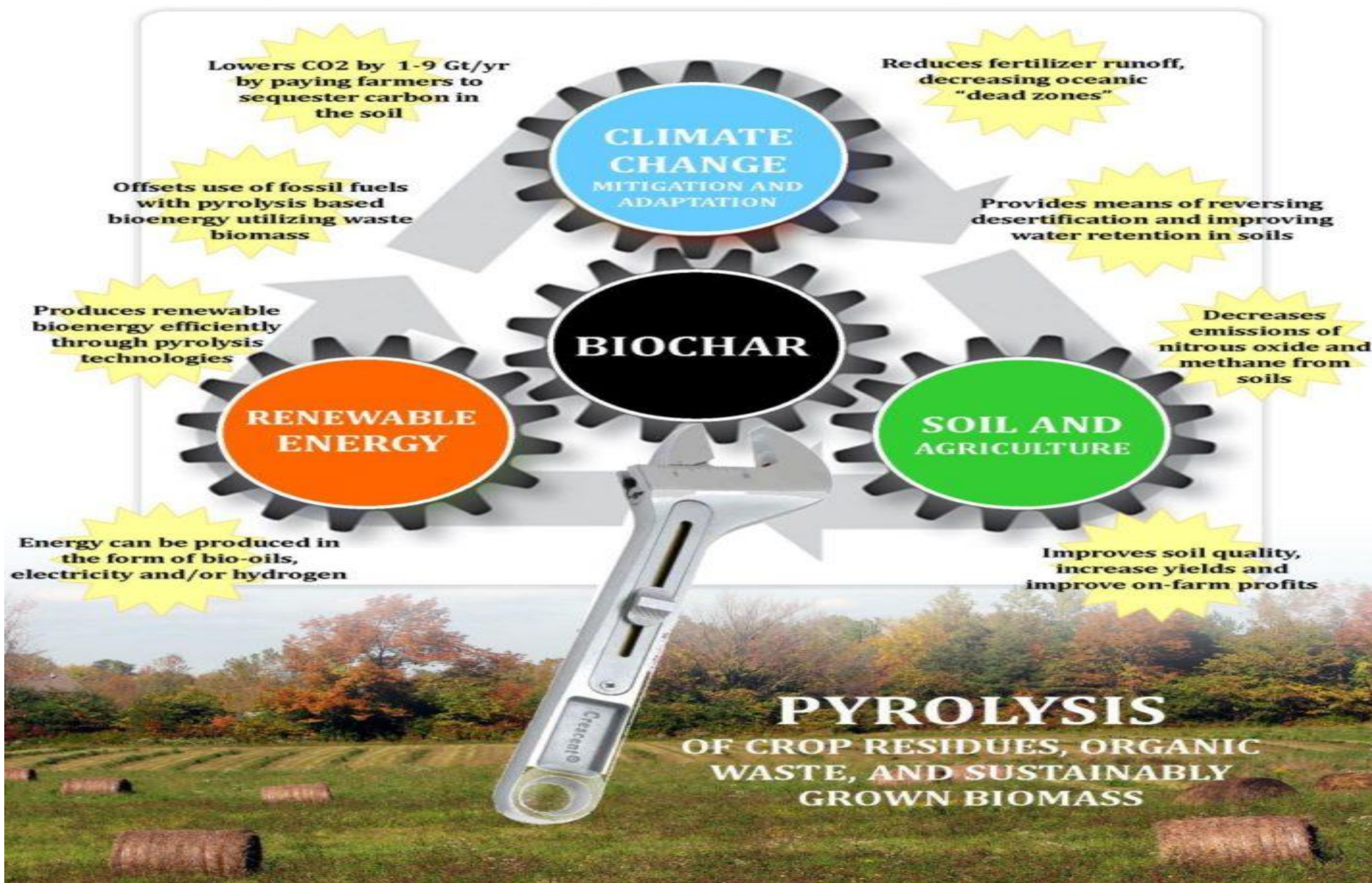
And hence Co-pyrolysis of both forms of wastes, a nutrient-rich, slowly releasing biochar and the sludge commonly high in Nitrogen and other valuable nutrients like phosphorous, is undertaken.



The PYRASOL project addresses synergies of both materials to reduce the individual treatment costs and to create a high value product and a zero-waste approach. Indirectly, this project addresses highly-required sanitation and sustainability standards of Smart Cities in a novel, economic and innovative fashion.

**Biochar and its services to Ecosystem:**

## SCHEMATIC OF BIOCHAR SOLUTIONS





Biochar and clean energy (heat and power) produced by pyrolysis (super-heating biomass in closed system-ovens) provides an alternative form of energy, reducing greenhouse gases by offsetting fossil fuel use and working along the Climate Action.

Upon addition to soil, biochar captures and sequesters the carbon that otherwise would oxidize and return to the atmosphere as CO<sub>2</sub> and cause Global Warming.

**Biochar-amended soils are known to provide a 50-80% reduction in nitrous oxide emissions.**

This can help us incessantly to further provide an impetus to Green planet dream that Humans nowadays nurture, without much change in efforts. Little and innate changes can therefore be integrated into our bigger charms of decelerating a bigger evil called Climate change.



## ICMR, Telangana Get Govt Nod To Test Vaccine Delivery Through Drones

CSIR-IIP,NAL,4PI,CSIO

30<sup>th</sup> April, 2021

The Ministry of Civil Aviation granted a conditional exemption from the Unmanned Aerial System (UAS) Rules to the Indian Council of Medical Research for conducting a feasibility study of Covid-19 vaccine delivery using drones. The Ministry of Civil Aviation issued an order in this regard earlier this week and said that ICMR had sought exemption from the



ministry via an email on February 12. The order signed by joint secretary in the Civil Aviation ministry Amber Dubey said that ICMR has to formulate a standard operation procedure which has to be approved by the Directorate General of Civil Aviation (DGCA).

“Now therefore, the Central government, in exercise of the powers conferred under Rule 70 of the UAS Rules 2021, grants conditional exemption to the applicant for a period of one year or until further orders, whichever is earlier from the UAS Rules 2021 for the aforementioned purpose,” the order read.

The ICMR has partnered with IIT Kanpur for this project. Speaking to MediaNama, Dr Samiran Panda, Scientist G and Head of the Epidemiology and Communicable Diseases division of the ICMR, said, “The purpose of the project is to deliver things through drones in cases where it may take a longer time to transport through roadways.” Panda said that they are yet to take a decision on whether ICMR and IIT Kanpur will take a pilot or a demonstration for this project, and indicated that in the coming days a decision will be taken in this regard.



## Telangana too receives nod from DGCA for vaccine delivery

The Ministry of Civil Aviation also accorded permission to the Telangana government for their ‘Medicine From the Sky’ project, which aims to deliver vaccines through drones. The permission, valid for a year, has been given for drones which operates within the visual line of sight (VLOS) range. In the coming those involved in this project are hoping that they receive exemption for beyond visual line of sight (BVLOS) operations too.

“A feasibility study is being conducted to look at how delivery drones can be used to improve medical supply chains, followed by a pilot implementation in Telangana. The project includes a comprehensive study of drone–based deliveries for blood, vaccines, medical samples and long tail medicine,” said an expression of interest document released by the Information Technology, Electronics and Communications department of Government of Telangana.

According to a release by the Telangana government, the plan for ‘Medicine from the Sky’ shall involve undertaking BVLOS flights in Vikarabad district of Telangana with the Area Hospital as the take-off site and various PHCs and sub-centres as the landing sites.

- Each drone would carry a combination of dummy vials and regular vaccines over the course of the trials
- Performance would be recorded in detail and data shall be used to guide further policies regarding full-scale adoption.
- The program shall be of 24 days, where the 8 selected consortia would be divided into 4 batches of 2 consortia, and each batch would perform the sorties for 6 days.
- A week to conduct on-ground recces would also be given to all consortia before the start of the program.

The Medicine from the Sky trials would yield important information on the reliability of drones and their adoption in medical deliveries. The approval from MoCA is highly appreciated and we look forward to working with the ministry in conducting these trials in the



safest manner by strict adherence to SOPs and having risk mitigation strategies in place — Jayesh Ranjan, principal secretary, IT and Industries department, Telangana government.

### **Other drone-vaccine delivery projects in the pipeline**

In February the office of the Principal Scientific Advisor proposed a pilot scheme to prove feasibility of distributing Covid-19 vaccine using unmanned aerial vehicles. The organizations responsible for this particular pilot are CSIR-Central Scientific Instruments Organization (CSIO), CSIR- National Aerospace Laboratory (CSIR-NAL), CSIR-Indian Institute of Petroleum (CSIR-IIP), CSIR-4PI and IIIT Bengaluru.

The pilot is planned in the region of Hoskote and Doddaballapura near Bengaluru, where CSIR-CSIO and the other organizations have institutional backup and industrial partners, according to the proposal document.

**Published in:**

[Medianama](https://www.medianama.com/2020/07/16/csir-drone-vaccine-delivery-projects-in-the-pipeline/)

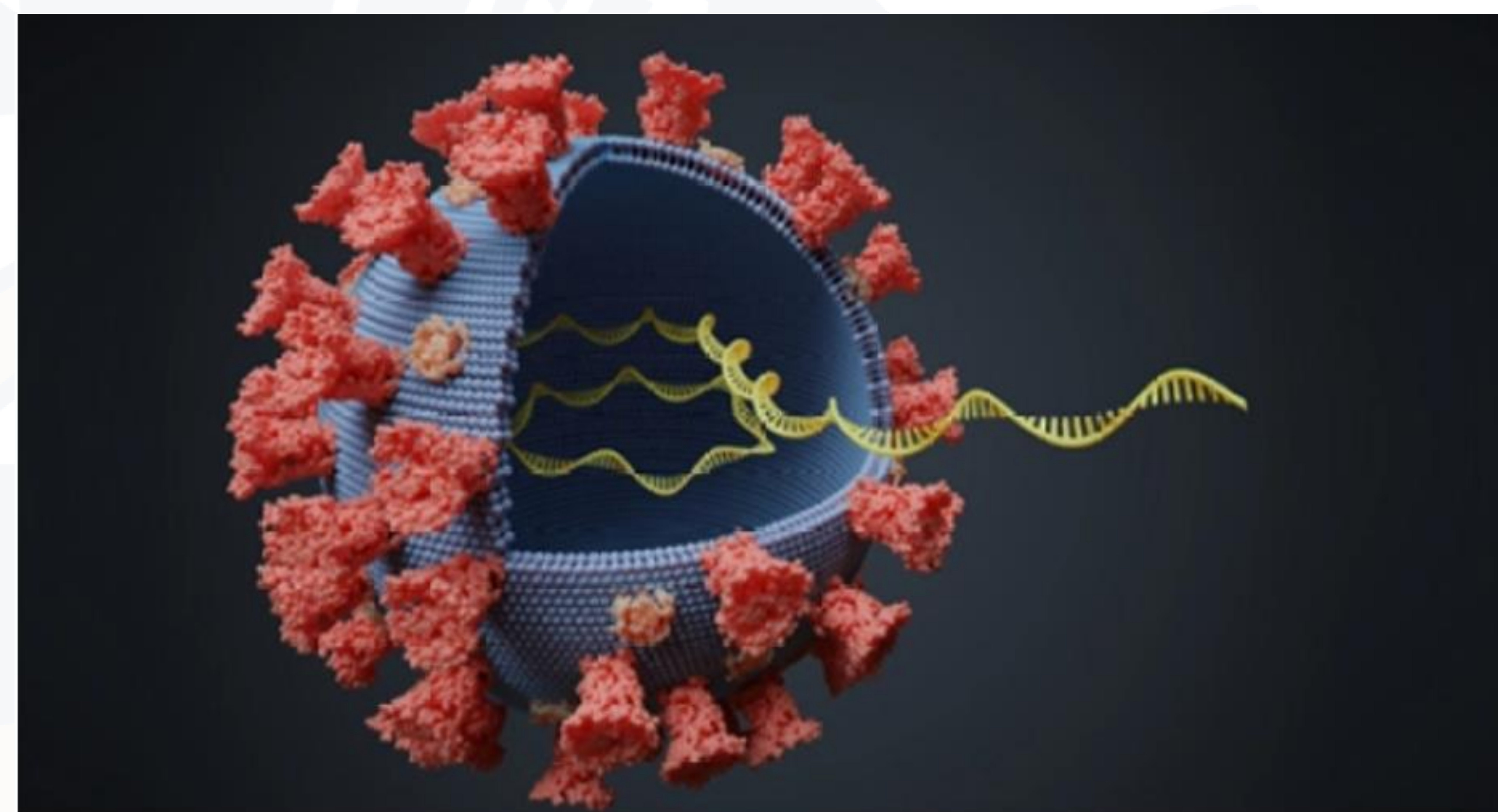


## COVID-19: Maharashtra Govt teams up with CSIR-IGIB for mutant tracking

CSIR-IGIB

30<sup>th</sup> April, 2021

The Maharashtra Government has signed a memorandum of understanding (MoU) with the Council of Scientific and Industrial Research (CSIR)-Institute of Genomics and Integrative Biology (IGIB) for SARS-CoV-2 genome sequencing. This move is along the lines of the Kerala Government, which had launched a genome sequencing program to better



understand the mutation of the novel coronavirus and validate the policies implemented to contain its transmission.

Dr Pradeep Vyas, Principal Secretary, Public Health, issued a notification on the MoU between the state government and CSIR-IGIB on Thursday.

Such an initiative was necessitated as the new mutant strains of coronavirus need immediate and effective attention. Early detection will be crucial to stop the spread of new mutants in the state.

As per the MoU, nearly 100 samples from 25 districts witnessing Covid positivity will be collected each month and sent for genome sequencing and this will be a three-month-long exercise.

A senior public health department official told The Free Press Journal, “Genome sequencing is being done in a wider geographic area of a pathogen (in this case, the SARS-CoV-2) as it helps in tracking mutants as and when they emerge in different geographical locations. These, therefore, form a very important tool in a surveillance mechanism, especially of mutants when



they arrive. This partnership of Maharashtra Government with IGIB will address some of these issues.” He said the state government would spend Rs 1.62 crore plus GST on this exercise.

State Covid-19 Task Force member Dr Shashank Joshi, who was engaged in a series of discussions in this connection, said, ”We need to do district-wise genome mapping and clinically correlate if there are any variants of concern in each district of Maharashtra. So, jointly, the Maharashtra government and the CSIR will systematically study this under a research program.” He further added that IGIB Director Dr Anurag Agarwal and CSIR DG Dr Shekhar Mande would ensure that a systematic study would be done.

The state government’s move comes at a time when active cases in Maharashtra are expected to touch 10.25 lakh by May 11, from the present 6,70,301.

**Published in:**

[Freepressjournal](https://www.freepressjournal.in)



## CCMB licenses quicker, dry swab RT-PCR method for Covid testing (Lead)

CSIR-CCMB

29<sup>th</sup> April, 2021

The Centre for Cellular and Molecular Biology (CCMB) has licensed dry swab-direct RT-PCR Covid-19 testing method developed by it to Capital Health Services India for commercialization. CCMB director Rakesh K. Mishra expects the testing method to be available in about a week. The development is likely to help in ramping up Covid-19 testing at a time when the country is battling a massive surge in the pandemic.



“We license the dry swab direct RT-PCR COVID19 testing method to Capital Health Services India Pvt Ltd for commercialization. Way to go for ramping up COVID19 testing across the country,” the CCMB tweeted on Wednesday.

The Indian Council of Medical Research (ICMR) in November last year had approved the simple and fast method of dry swab-direct RT-PCR, developed by CCMB, a constituent lab of the Council of Scientific and Industrial Research (CSIR).

This method developed by CSIR-CCMB is a simple variation of the existing gold standard RT-PCR method and can easily scale up the testing by two to three fold with no new investment of resources, the ICMR had announced. After evaluating this method and finding an overall concordance of 96.9 per cent, the ICMR issued an advisory for the use of CSIR-CCMB dry swab method, considering its lesser cost and quick turn-around time.



CSIR-CCMB has been testing samples for coronavirus since April 2020. Having worked closely with the healthcare workers of Telangana, it identified some of the key issues that slow the testing process. In response to it, the researchers developed the dry swab RNA-extraction free testing method for Covid-19.

The dry swab-direct RT-PCR method involves collecting and transporting the nasal swab in dry state (as opposed to using the viral transport medium VTM) which makes the transportation and handling of the samples easy and less prone to spillage and spread of infection.

Secondly, the step of RNA isolation from the sample is omitted and involves only simple processing of the sample followed by direct RT-PCR using the kit recommended by ICMR.

Omitting the step of RNA isolation offers a huge benefit over the conventional method, as the RNA isolation is a major bottleneck in terms of time, cost and trained manpower.



## CSIR-CMERI Transfers The Technology To Companies' To Ramp Up The Production Of Oxygen Enrichment Unit

CSIR-CMERI

29<sup>th</sup> April, 2021

New Delhi: CSIR-CMERI, Durgapur transferred the technology of Oxygen Enrichment Unit developed by the Institute virtually on 29.04.2021 in presence of Prof. (Dr.) Harish Hirani, Director, CSIR-CMERI to M/s Jyoti CNC Automation Ltd, Rajkot and M/s GRID Engineers Pvt Ltd, Gurugram.



On this occasion Prof. Hirani mentioned about the need of better distribution strategies of O<sub>2</sub> particularly in the present COVID-19 pandemic scenario. On average, an individual requires 5-20 LPM air containing appropriate percentage of oxygen. The technology developed by CSIR-CMERI provides in-house enrichment of Oxygen and offers independence from external parties as well as eliminates the risks and difficulty of handling bulky cylinders. CSIR-CMERI developed OEU can help patients to recover faster.

Prof. Hirani also stated that CSIR-CMERI has transferred the license for production, marketing and service to four industries and he is confident that the all four parties are able to manufacture the product by the 2nd week of May 2021.

Mr. Gupta, Managing Director of M/s GRID Engineers Pvt Ltd, Gurugram appreciated the Institute developed oxygen enrichment technology and it's utility in the present scenario. He also assured of overcoming some bottlenecks in importing the required compressors from China and USA. He stated that initially his company may start manufacturing 25 to 50 pieces per day and trying to speed up the production. CSIR-CMERI suggested to explore the



sources from some Ahmedabad based companies also. Mr. Gupta informed that his company would also work on aesthetic appearance and digital functionality of the product for its larger acceptance in the market. Mr. Gupta also added that they are looking the matter not only from the commercial perspective but also as the service to the society.

During the transfer the Managing Director of M/s Jyoti CNC Automation Ltd, Rajkot confirmed that within a week they would manufacture the prototype and try to ramp up the production capacity as per the demand as they have their own capability for manufacturing compressor also. He also said that as the requirement is very high presently they would try to manufacture more than 1000 pieces per day and they are planning to convert the metal sheet body into plastic body considering the aesthetic, portability and cost aspects. To serve the demand in the existing scenario, they are working 24x7 to achieve the fast production of the unit thereby service to the nation.

**Published in:**

[Indiaeducationdiary](http://indiaeducationdiary.com)



## AYUSH 64 found useful in the treatment of mild to moderate COVID-19 infection

CSIR-IIIM

29<sup>th</sup> April, 2021

In the middle of the havoc wreaked by second wave of the pandemic, AYUSH-64 has emerged as a ray of hope for the patients of mild and moderate COVID-19 infection.

The scientists of reputed research institutions of the country have found that AYUSH 64, a poly herbal formulation developed by the Central Council for



**Anti-Malarial Drug**

**AYUSH - 64**

**Composition**

Each tablet contains :		
Saptaparna Stem Bark ( <i>Alstonia scholaris</i> )	Aqueous Extract	100 mg
Katuki Root ( <i>Picrorhiza kurroa</i> )	-do-	100 mg
Chirayata Whole plant ( <i>Swertia chirata</i> )	-do-	100 mg
Kuberaksha Seed ( <i>Caesalpinia crista</i> )	Power	200 mg

**Pharmacological and Toxicological Studies**

Ayush-64 in the dose of 500 mg per kg body weight for 12 weeks has been proved safe and non-toxic.

**Plants shown:**  
 Kuberaksa (*Caesalpinia crista* Linn.)  
 Chirayata (*Swertia chirata* Buch-Ham)  
 Katuki (*Picrorhiza kurroa* Royle)

Research in Ayurvedic Sciences (CCRAS), Ministry of Ayush is useful in the treatment of asymptomatic, mild and moderate COVID-19 infection as an adjunct to standard care. It is worthwhile to mention that initially the drug was developed for Malaria in the year 1980 and now is repurposed for COVID-19.

The Ministry of Ayush-Council of Scientific and Industrial Research (CSIR) collaboration has recently completed a robust multi-centre clinical trial to evaluate the safety and efficacy of AYUSH 64 in the management of mild to moderate COVID-19 patients.

AYUSH 64 comprises of *Alstonia scholaris* (aqueous bark extract), *Picrorhiza kurroa* (aqueous rhizome extract), *Swertia chirata* (aqueous extract of whole plant) and *Caesalpinia crista* (fine-powdered seed pulp). It is extensively studied, scientifically developed, safe and effective Ayurveda formulation. This medicine is also recommended in National Clinical Management Protocol based on Ayurveda and Yoga which is vetted by National Task Force on COVID-19 Management of ICMR.



Dr Arvind Chopra, Director, Centre for Rheumatic Diseases, Pune and honorary chief clinical coordinator of the Ministry of Ayush - CSIR collaboration informed that the trial was conducted at three centres. KGMU, Lucknow; DMIMS, Wardha and BMC COVID Centre, Mumbai involving 70 participants in each arm. Dr Chopra stated that AYUSH 64 as an adjunct to standard of care (SoC) showed significant improvement and thus lesser period of hospitalization as compared SoC alone. He also shared that several significant beneficial effects of AYUSH 64 on general health, fatigue, anxiety, stress, appetite, general happiness and sleep were also observed. Dr. Chopra concluded that this controlled drug trial study has provided substantial evidence that AYUSH 64 can be effectively and safely used to treat mild to moderate cases of COVID-19 as adjuvant to SoC. He also added that, patients on AYUSH 64 will still require monitoring so as to identify any worsening of disease requiring more intensive therapy with oxygen and other treatment measures provided during hospitalization.

Dr. Bhushan Patwardhan, National Research Professor, Ayush and Chairman of the Inter-disciplinary Ayush Research and Development Task Force on COVID-19 stated that the results of AYUSH-64 study are highly encouraging and in the current crisis situations needy patients should be able to get benefits of Ayush 64. He also underlined that this multi-centre trial was monitored by Ayush-CSIR Joint Monitoring Committee (MC) under the chairmanship of Dr. V M Katoch, former Secretary, Department of Health Research and former Director General, Indian Council of Medical Research (DG, ICMR). He further added that these clinical studies periodically reviewed by an independent Data and Safety Management Board (DSMB).

Dr. V M Katoch, Chairman of the MC informed that the committee has carefully reviewed the outcome of AYUSH 64 study and recommended AYUSH 64 in the management of asymptomatic, mild to moderate COVID-19. It is worthwhile to note that this committee has also recommended Ministry to communicate to the state licensing authorities/regulators regarding adding new indication of AYUSH 64 for repurposing in the management of mild to moderate COVID-19.



Dr. N. Srikanth, Director General, CCRAS elaborated that additional studies on Ayush 64 are underway at reputed research institutes including CSIR-IIIM, DBT-THSTI, ICMR-NIN, AIIMS Jodhpur and Medical Colleges including Post Graduate Institute of Medical Education & Research, Chandigarh; King George's Medical University, Lucknow; Government Medical College, Nagpur; Datta Meghe Institute of Medical Sciences, Nagpur. Results received so far have shown the usefulness of AYUSH 64 in dealing with mild and moderate COVID-19. He also added that the outcome of the seven clinical studies has revealed that AYUSH 64 exhibits early clinical recovery in COVID-19 cases without further progression. In all clinical studies, AYUSH 64 was found to be well tolerated and found clinically safe.

**Published in:**

[Ddinews](https://www.dinews.in/)



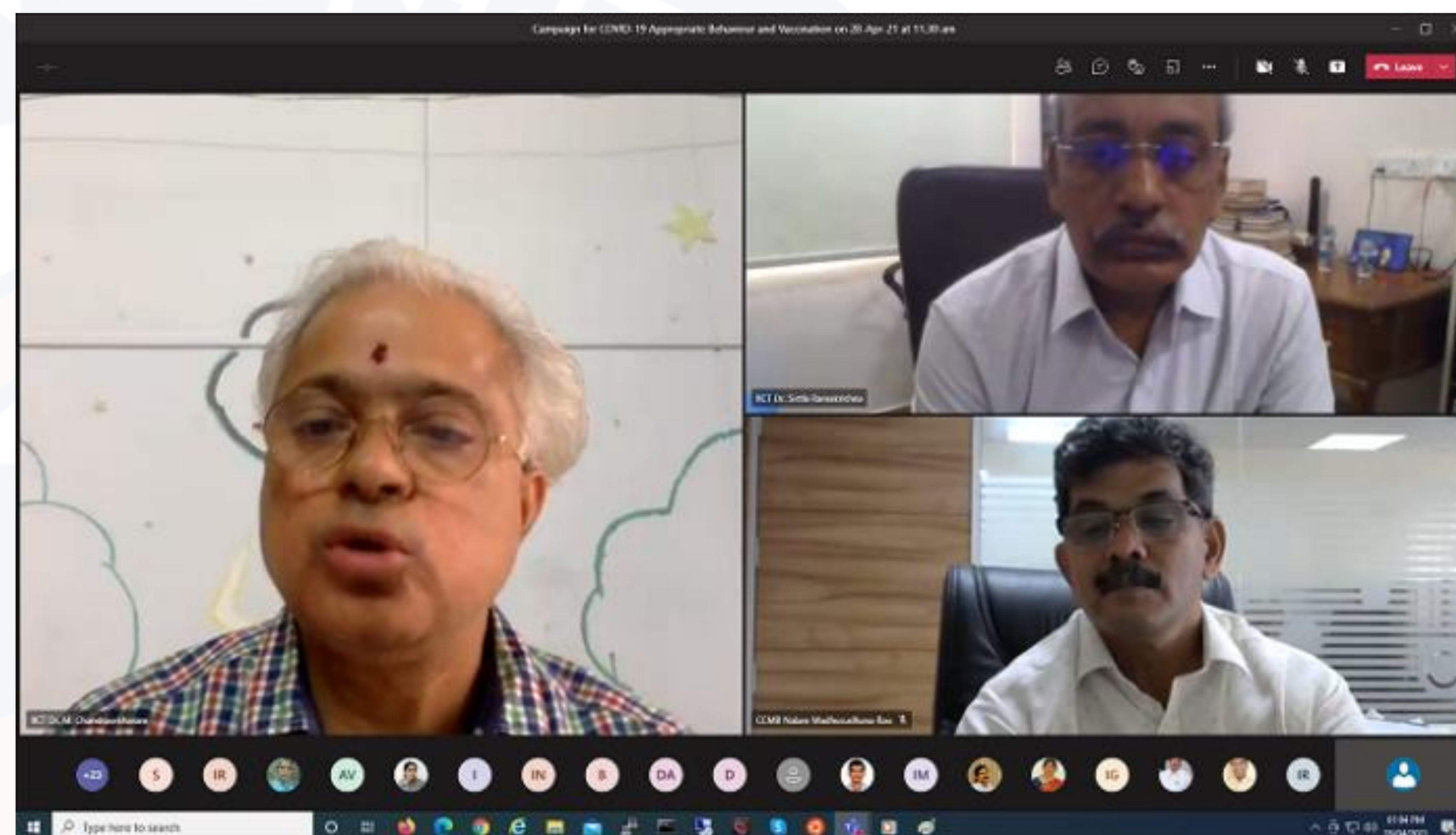
## Prevention and Vaccinations are the best tools against Covid-19

CSIR-IICT,CCMB

29<sup>th</sup> April, 2021

Hyderabad: Covid appropriate behaviour and vaccination together can be powerful tools to protect people against the disease.

In an interesting webinar “Campaign for Covid-19 Appropriate Behaviour and Vaccination” conducted by the city-based CSIR-Indian Institute of Chemical Technology (IICT), panelists encouraged people to get vaccinated, and take precautions to protect against the disease



Dr S Chandrasekhar, Director CSIR- IICT, in his welcome address said that people should not hesitate to take vaccine as vaccination is one proven way to control the disease. He said the firms manufacturing vaccines worked under very difficult conditions to deliver and protect people against Covid-19.

When vaccination was open to frontline workers there was a hesitancy to take them mainly due to misinformation, and many decided to adopt a wait and watch policy, said another Hyderabad-based ICMR's lab, National Institute of Nutrition (NIN) Director, Dr R Hemalatha. She said side-effects of a vaccine are minor, but the complications that arise from Covid infections such as pneumonia and other issues are prevented by the vaccines.

“Vaccines train the immune system to fight the virus, and this takes some time to develop,” she said and added; “The second dose further stimulates the immune system to produce more neutralizing Antibodies and Tcell memory formation that last longer.” She further observed



that 0.03 to 0.04% people may get infected with Covid even after vaccination but they experience nil or mild symptoms not leading to complications- that means the vaccines are very efficacious.

She also mentioned that women have better resistance, but the same has not been proved against Covid. She urged women to go ahead and get themselves vaccinated even while in their periods, and not to believe misinformation on the issue. She, also mentioned that there is no data to suggest that the vaccine was safe for pregnant women and lactating mothers. She advised people to adopt a healthy diet to build good immunity.

The use of RT-PCR test kits are best and standard method for COVID testing, when the sample is collected as nasopharyngeal swab, Dr N Madhusudhana Rao, CEO of Atal Incubation Center-CCMB, said.

The accuracy of the test results depends on the expertise of frontline workers handling the swabs, and technicians at the diagnostic centers. The current high load of tests can cause stress on the test centers, which can sometimes give inaccurate results. The Dry Swab technology developed by the CSIR-Center for Cellular and Molecular Biology (CCMB) is safe and cost effective when combined with the RT-PCR tests, Dr Rao added.

Commenting on the Covid mutants, he said CCMB has processed 2500 sequences, and discovered seven variants are distributed all over the country. However, in Maharashtra the double mutant variant is widely prevalent.

He urged people not to be alarmed over the reports on virus mutants, as the present vaccines are the best weapons against them. He said while variants of concern (VOC) have published data that can help in determining avenues to limit them, the variants of importance (VOI) do not have sufficient data on their behaviour.



“Consulting a doctor is the best option rather than relying on social media reports”, said Dr Sistla Ramakrishna, Senior Principal Scientist of CSIR-IICT. He further elaborated that the battle against Covid-19 has two components: Prevention and Treatment. “Prevention is the right tool to arrest the disease. Prevention in terms of vaccination and following Covid protocols are necessary for all. Self-discipline is required to follow social distancing in the market and other places,” he pointed out.

He emphasised the need for Stores have demarcations to enforce social distancing. Such rules can be strictly followed only if a person has self-discipline. In workplaces, meetings can be convened virtually, discouraging physical gathering at a particular place.

Dr Ramakrishna also stressed the need to wear masks properly. He said people often pull it down on their chins or below the nose. As the virus is airborne, it is advised to have masks all times that covers the nose and mouth. He insisted that people wear masks even at homes, maintain physical distance between their family members, and have meals in a segregated manner.

He asked people to dispose of used masks properly, as this is an important part of prevention. He appealed to people to avoid unnecessary travel. He said people did not give importance to masks in the November-December last year, just when the first wave of the Covid-19 was decreasing. “Had people complied to wearing masks and adhering to social distancing, then the second wave, which is a tsunami, could have been limited to a great extent,” he said. He urged people to go ahead with their vaccinations, wear masks and protect themselves from the disease.

Dr M Chandrasekharam, Senior Principal Scientist, CSIR-IICT, moderated the webinar with relevant and specific questions, which were aimed at clearing common concerns and removing fear among people.

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## **Bharat Biotech's BSL-3 aims to produce 700 million doses of Covaxin per annum**

CSIR-IICT

29<sup>th</sup> April, 2021

Biotechnology major Bharat Biotech's BSL-3 (Biosafety Level-3) facilities will play a pivotal role in empowering the company's plans to ramp-up production of India's first indigenously developed Covid-19 vaccine. Accordingly, the biotechnology major plans to produce 700 million doses of Covaxin per annum.

The vaccine is regarded as one of the safest in the world and highly efficient against the UK, SA, Brazilian and the new Indian double mutant strain of Covid-19 virus. In a conversation with IANS, Krishna Ella, Chairman and Managing Director of Bharat Biotech International said the capacity expansion process has been initiated across multiple facilities since early 2021.

Presently, the company manufactures 20 million doses per month of Covaxin which are supplied to the Ministry of Health for the national vaccine rollout. Manufacturing scale up has been carried out in a stepwise manner across multiple facilities at Hyderabad, and Bangalore," he said.

"Inactivated vaccines, while highly safe, are extremely complex and expensive to manufacture, resulting in lower yields when compared to live virus vaccines." Notably, Bharat Biotech is able to expand Covaxin manufacturing capacity mainly due to the availability of four new specially designed BSL-3 facilities.

In industry parlance, a BSL-3 facility is equipped to safely handle infectious biological pathogens in the highest stringent environmentally controlled manufacturing facility. At present, the company has four facilities BSL-3 facilities two in Hyderabad and two in Bengaluru.



"These facilities have been repurposed due to a strong pre-existing expertise in development of viral vaccines and know-how applied to manufacture, test and release the highly purified inactivated viral vaccine."

The company has recently entered into a 'Master Collaborative Agreement' (MCA) with CSIR-Indian Institute of Chemical Technology (CSIR-IICT), to collaborate on the development of novel platform technologies in developing a synthetic process route for adjuvant molecule 'TLR 7/8' for Covaxin. Bharat Biotech uses a proprietary adjuvant Algel-IMDG, that has now proven to be a safe and effective adjuvant, especially to stimulate memory T cell responses.

The synthesis and manufacture of the IMDG component has been successfully indigenized and will be manufactured at commercial scale within the country. This is the first instance where a novel adjuvant has been commercialized in India. Besides, the company has secured long term components, packing materials and single use consumables supplies for the manufacturing ramp-up. To further increase bulk capacity Bharat Biotech has entered into agreements with Indian Immunological (IIL) to manufacture the drug substance for Covaxin.

"The technology transfer process is well underway and IIL has adequate capabilities to manufacture inactivated viral vaccines at commercial scale and under required 'GMP' standard. We are also looking forward to getting into manufacturing partnerships in other countries.

Currently, Covaxin has received 'Emergency Use Authorizations' in several countries across the globe with another 60 in process.



## National Geophysical Research Institute set to send teams to Assam

CSIR-NGRI

29<sup>th</sup> April, 2021

HYDERABAD: The Hyderabad-based National Geophysical Research Institute (NGRI) said on Wednesday that it will send its team of researchers to Assam for conducting a preliminary assessment of the damage on ground caused by the 6.3-magnitude-earthquake that jolted the State on Wednesday.

The NGRI said that more than 70 aftershocks were recorded till around 4.30 pm, the largest being of magnitude 4.9. The NGRI, which has a widespread seismological network across the country, said that its various seismological stations recorded the Assam earthquake. The magnitude of the earthquake was 6.3 on Richter scale and it occurred at a depth of 26km.

The closest seismology station of NGRI is located at Tezpur, situated around 40km from Dhekiajuli, the earthquake's epicentre. The NGRI has said that as per the initial reports, liquefaction (sand mixed water oozing out through fissures) and fissures due to lateral spreading are observed in the soft soil in the vicinity of the epicentre of the earthquake.

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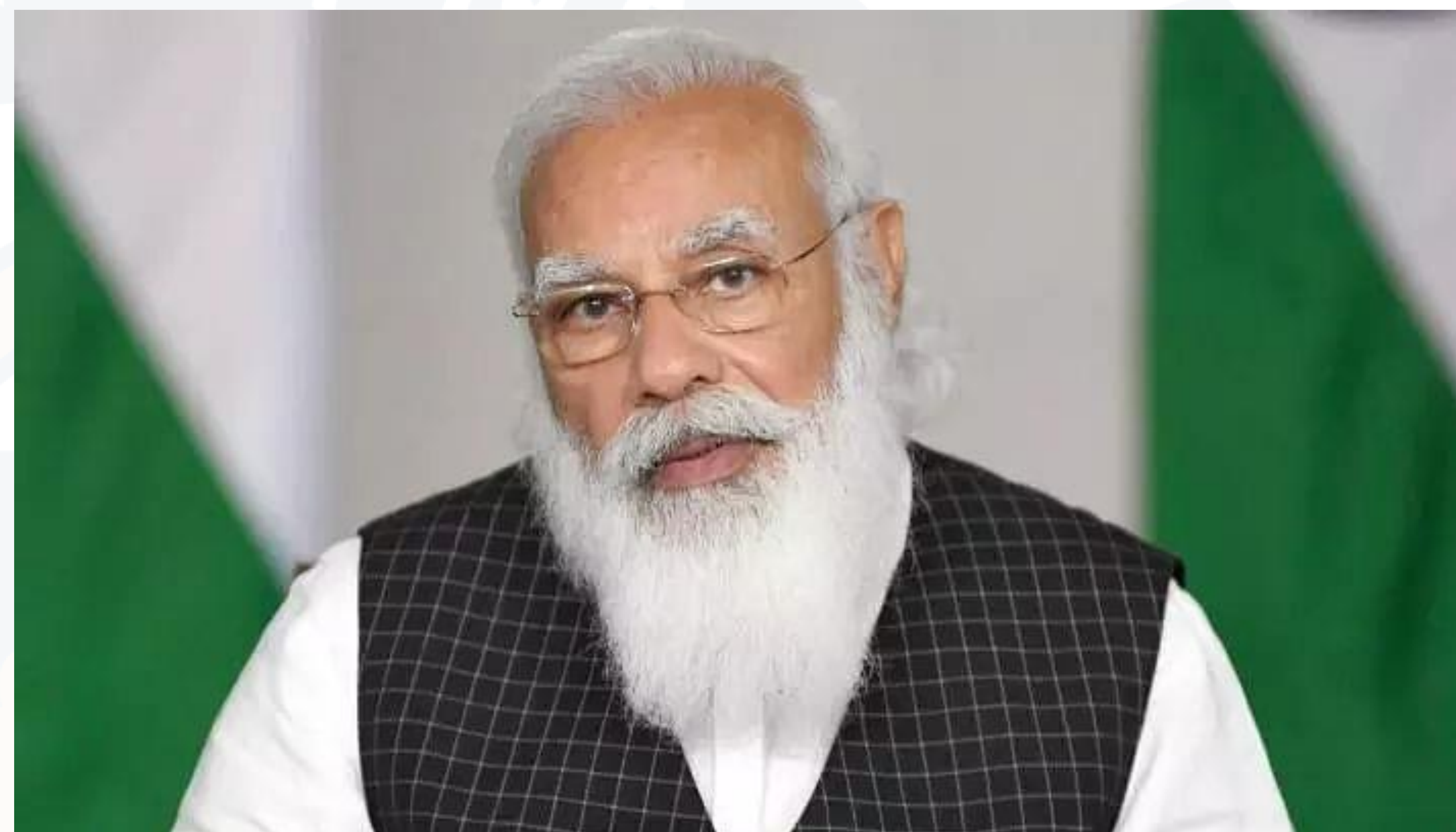
## PM Narendra Modi nod to procuring 1 lakh portable oxygen concentrators

CSIR

29<sup>th</sup> April, 2021

Prime Minister Narendra Modi on Wednesday sanctioned the procurement of one lakh portable oxygen concentrators from the PM Cares Fund.

The decision was taken at a high-level meeting, chaired by the Prime Minister, to discuss the measures needed to improve liquid medical oxygen (LMO) supply for Covid management. He instructed that these oxygen concentrators should be



procured at the earliest and provided in states with a high case burden.

In addition to the earlier sanctioned 713 Pressure Swing Adsorption (PSA) plants under PM Cares Fund, 500 new PSA plants have been sanctioned. The PSA plants will augment the supply of liquid medical oxygen at hospitals in district headquarters and Tier 2 cities. These 500 PSA plants will be established with transfer of the indigenous technology developed by the DRDO and the CSIR to the domestic manufacturers.

Establishing PSA plants and procurement of portable oxygen concentrators will greatly augment the supply of oxygen near the demand clusters, thereby addressing the current logistical challenges in transporting oxygen from plants to hospitals, an official statement said. (IANS)

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[Sentinelassam](https://www.sentinelassam.com)



CSIR-NGRI

29<sup>th</sup> April, 2021

## Dr. Purnachandra Rao's (Chief Scientist, CSIR-NGRI) Interview to Eenadu on the recent Uttarakhand disaster

# మంచుకొండల్లో కలవరం ముందే గుర్తించే పరికరం

- భూకంపలేఖనిలతో ముందస్తు హెచ్చరికలు
- ఉత్పాదలపై అత్యంత కచ్చితత్వంతో సమాచారం
- దేశంలోనే తొలిసారి అభివృద్ధి చేసిన ఎన్జీఆర్ఐ
- 'ఈనాడు'తో సంస్థ ప్రధాన శాస్త్రవేత్త డాక్టర్ పూర్ణచంద్రరావు



ఈనాడు, హైదరాబాద్: హిమాలయాల్లో కొండచరియలు విరిగిపడి భారీ ప్రమాదాలు జరుగుతున్నాయి. భూతాపంతో మంచు కొండలు కరుగుతున్నాయి. ఈ ఏడాది ఫిబ్రవరిలో ఉత్తరాఖండ్‌లో శిఖరాలపై మంచు కరిగి హఠాత్తుగా వరదలు పోటెత్తడంతో వంద మంది కిక్కిరిస్తూ ప్రాణాలు కోల్పోయారు.

ప్రతి రెండు మూడేళ్లకు ఇలాంటి ఉత్పాదలు హిమాలయాల్లో సంభవిస్తున్నాయి. ఇప్పటివరకు ముందస్తు హెచ్చరిక వ్యవస్థ లేకపోవడంతో తరచూ భారీగా ఆస్తి, ప్రాణనష్టం జరుగుతోంది. ఇలాంటి ముప్పును భూకంప లేఖనిల సాయంతో ముందే గుర్తించే వ్యవస్థను తొలిసారి అభివృద్ధి చేశామని జాతీయ భూ బౌతిక పరిశోధన సంస్థ(ఎన్జీఆర్ఐ) ప్రధాన శాస్త్రవేత్త డాక్టర్ ఎన్.పూర్ణచంద్రరావు 'ఈనాడు' ముఖాముఖిలో వెల్లడించారు.

**1 హిమాలయాల్లో ఎలాంటి విపత్తులు పొంది ఉన్నాయి?**

హిమాలయాలకు భూకంపాలే కాదు... కొండ చరియలు విరిగిపడడం, మంచు పలకాలు కరిగి వరదలు రావడం, వర్షాకాలంపై మంచు చెరువులా ఏర్పడి భూతాపంతో హఠాత్తుగా కరిగి విరుచుకుపడడం

వంటి విపత్తులు అనేకం పొంచి ఉన్నాయి. ఉత్తరాఖండ్‌లో ఫిబ్రవరి 7న జరిగిన ప్రమాదం దీనికో ఉదాహరణ. 5600 మీటర్ల ఎత్తులో కొండపైన ఉన్న రాళ్లు కిందపడ్డాయి. వాటితో పాటు మంచు కరిగి కింద ఉన్న రిషిగంగలోకి వరద పోటెత్తింది. ఏప్రిల్ 23న మంచు చరియలు విరిగిపడి 11 మందివరకు చనిపోయారు. వాతావరణ మార్పులు, భూతాపంతో హిమాలయాలకు ముప్పు పెరిగింది.

**2 విపత్తుల సమాచారాన్ని తెలుసుకునేందుకు ఉపగ్రహ వ్యవస్థ ఎలా ఉపయోగపడుతోంది?**

హిమాలయాల్లో విపత్తులకు సంబంధించి శాటిలైట్ చిత్రాల ద్వారా ఇప్పటివరకు సమాచారం సేకరిస్తున్నాం. అంతా జరిగిపోయాక అక్కడ పరిస్థితి ఎలా ఉందో తెలుసుకునేందుకు మాత్రమే ఈ చిత్రాలు ఉపయోగపడుతున్నాయి. పైగా ఉపగ్రహం నుంచి ఒక చిత్రం పంపిన తర్వాత మరోటి రావడానికి కొంత సమయం పడుతుంది. ఈ సమాచారం వచ్చేలోపే కొన్నిసార్లు తీవ్ర నష్టం వాటిల్లుతోంది. సమాచార అంతరం ఇక్కడ పెద్ద అగాధంగా ఉంది. రియల్ టైమ్ వర్ణవేక్షణ ఉండడం లేదు.



హిమాలయాలు \* విరిగి పడిన కొండ చరియలు

**3 భూకంపలేఖనిల సాయంతో కొత్త వ్యవస్థ ఎలా పనిచేస్తుంది?**

హిమాలయాల్లో ఎన్జీఆర్ఐ కొన్ని సంవత్సరాల క్రితం వేర్వేరు ప్రాంతాల్లో 80 భూకంప లేఖనిలను ఏర్పాటుచేసింది. ఇది చాలా ముఖ్యమైన నెట్వర్క్. అని చెప్పాలి. భూకంప లేఖనిలో చిన్న శబ్దం కూడా రికార్డువుతుంది. పైగా సెక్స్ వ్యవధిలోనే ఆ విషయం పర్యవేక్షణ కేంద్రానికి చేరుతుంది. సెక్సుకు మూడు నుంచి ఆరు కిలోమీటర్ల వేగంతో సమాచారం అందుతుంది. కొండ చరియలు, మంచు పలకాలు విరిగినప్పుడు కూడా శబ్దాలు రికార్డువడం గమనించాం. అంత ఎత్తు నుంచి మంచు చరియలు విరిగి వరద నదిలో కలిసేందుకు ఆరగంట సమయం పడుతుంది. ఈలోగా అక్కడ యంత్రాగాన్ని ఆప్రమత్తం చేస్తే ప్రాణ నష్టం లేకుండా కాపాడుకోవచ్చు.

**4 ఈ విధానంలో సవాళ్లను ఎలా అధిగమించారు?**

పెద్ద శబ్దాలతో వచ్చే భూకంపాలను లేఖనిలో సులువుగా గుర్తించవచ్చు. సిగ్నల్ అధారంగా గుర్తించడం తేలిక. అయితే వీటిలో డ్రాఫిట్, వర్షం కురిసిన శబ్దాలు కూడా రికార్డువుతాయి. ప్రత్యేకించి కొండచరియలు విరి

గినప్పుడు వచ్చే శబ్దాలను గుర్తించడం ఒక కేంద్రంలో అయితే కష్టం. అక్కడ ఉన్న వివిధ భూకంపలేఖనిల్లో ఒకే విధమైన శబ్దాలు రికార్డు అయినప్పుడు వాటిని గుర్తుపట్టడం సాధ్యమవుతుంది. వీటిని నైతం సులువుగా గుర్తించేందుకు మా బృందం ఒక కొత్త విధానాన్ని అభివృద్ధి చేసింది. ఇది కచ్చితత్వంతో పనిచేస్తుంది. ఒక సెక్సులో మందోమంతు కచ్చితత్వం సాధ్యమైంది. పలితంగా సులువుగా డ్రాఫ్ట్ చేయవచ్చు.

**5 ఇప్పటికే ఉన్న భూకంపలేఖనిలు సరిపోతాయా? మరిన్ని ఏర్పాటు చేయాలా?**

ఇప్పుడు ఉన్నవాటి సంఖ్య చాలా ఎక్కువే. ఇవి సరిపోతాయి. కొన్నిచోట్ల వాటి స్థానాలను మార్పులు చేయాల్సి ఉంటుంది. భూకంపలేఖని సాయంతో ముందస్తు హెచ్చరికల వ్యవస్థను అభివృద్ధి చేయడం దేశంలోనే ఇది మొదటిది. ప్రపంచంలో వేర్వేరు దేశాలు ప్రయత్నాలు చేస్తున్నాయి. ఈ తరహా సమాచార సేకరణలో అనుభవం ఉన్న జర్మనీతోనూ మనం కలిసి పని చేస్తున్నాం. ఎక్కడా అవరణలోకి రాలేదు. మనది అందుబాటులోకి వచ్చి సమాచారం పక్కాగా అందితే ప్రపంచంలోనే మొదటిది అవుతుంది.

Published in:

Eenadu



CSIR-IICT

29<sup>th</sup> April, 2021

## April Panel Discussion

### టీకాలపై భరోసా పెరుగుతోంది

- త్వరలోనే అందుబాటులోకి 'సెప్పివాక్'
- ఐఐసీటీ డైరెక్టర్ డాక్టర్ ఎస్.చంద్రశేఖర్

ఈనాడు, హైదరాబాద్: కొన్ని ఆప్ సైంటిఫిక్ అండ్ ఇండస్ట్రీయల్ రీసెర్చ్ (సీఎస్ఐఆర్), క్యాడెలా సంస్థతో కలిసి తీసుకొస్తున్న 'సెప్పివాక్' టీకా త్వరలోనే అందుబాటులోకి వస్తుందని ఐఐసీటీ డైరెక్టర్ డాక్టర్ ఎస్.చంద్రశేఖర్



ఎస్.చంద్రశేఖర్

అన్నారు. రష్యాకు చెందిన స్పూత్నిక్, సెప్పివాక్ టీకాలు అందుబాటులోకి వస్తే మే 15 నాటికి వ్యాక్సిన్ కొరత తీరుతుందన్నారు. ఐఐసీటీ అధ్యక్షుల కోవిడ్-19 నియంత్రణ, టీకాలపై అవగాహన ఋథ వారం ఆంతర్జాలంలో చర్చావేదికను నిర్వహించింది. ఈ సందర్భంగా ఆయన మాట్లాడుతూ.. ఎప్పుటికీ కేసులు తగ్గుతాయనేది ఎవరికీ తెలియదు. భయపడకుండా సంయమనంతో కరోనాను గెలవాలన్నారు. కోవిడ్తో న్యూమోనియా, ఇతర ఆనాలోగ్లు వల్ల తలెత్తే సమస్యలు టీకాల ద్వారా నివారించొచ్చునని జాతీయ పోషకాహార సంస్థ (ఎన్ఐఎన్) డైరెక్టర్ డాక్టర్ హేమలత అన్నారు. సీసీఎంబీ-ఆటల్ ఇంక్యుబేషన్ సెంటర్ సీఈవో డాక్టర్ మదుసూదన్ రావు మాట్లాడుతూ తాము అభివృద్ధి చేసిన ఫ్లెక్సోబిల్ సాంకేతికతతో తక్కువ ఖర్చుతో తక్కువ వ్యవధిలో ఫలితాలు వెల్లడించవచ్చునని చెప్పారు. ఐఐసీటీ ప్రధాన శాస్త్రవేత్త డాక్టర్ శిష్ట రామకృష్ణ, ఐఐసీటీ ప్రధాన శాస్త్రవేత్త డా.ఎం చంద్రశేఖరం పాల్గొన్నారు.

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## ‘With vaccines, we can even eliminate this pandemic’

NIN director advocates diet of fruits, vegetables and pulses plus nuts along with lowering of cereals intake

V. GEETANATH  
HYDERABAD

ICMR-National Institute of Nutrition (NIN) director R. Hemalatha has said that the latest data across the world has shown that vaccines taken in double dose spread over a period of few weeks is safe and efficacious in preventing severe infection even if one contracts COVID-19.

“We can even eliminate this pandemic as vaccines have proven to be successful earlier, whether it was for small pox or polio. Two doses are required for a person as the first dose stimulates our immune system to generate neutralising antibodies – from seven days up to two/three or four weeks. The second dose makes it (immune response) stronger as the first one may not be potent enough to tackle the infection. Both are very important,” she asserted.

The director was participating in a virtual meeting organised by the CSIR-Indian Institute of Chemical Technology (IICT) ‘Campaign for COVID-19 appropriate behaviour and vaccination’ in Telugu moderated by principal scientist M. Chandrasekharam on Wednesday. IICT director S. Chandrashekar in his introductory remarks was confident of a larger population being inoculated as two more vaccines would be available by mid-May.

### Safety norms

Even after double-dose vaccination, citizens need to observe COVID-appropriate behaviour because one is



**Two doses are required for a person as the first dose stimulates our immune system to generate neutralising antibodies.**

R. HEMALATHA,  
Director, National Institute of Nutrition

capable of spreading the virus to others. “There is a chance of mild infection even after double-dose vaccination and it is always better to take a COVID test if the symptoms are there, because the person is capable of infecting others though the chances are minimal. In one lakh persons, 40 may get infected, but they are likely to have a low viral dose and have been found to have no complications like pneumonia so they are 80-90% safe,” said Dr. Hemalatha.

### Menstruating women

There is no sufficient evidence to show women are safer from COVID, yet they “seem to be recovering faster”. Menstruating women too can take the vaccine, but there is not much data on whether pregnant or lactating mothers can be given the doses, or even for children, because studies have been not been conducted for

those categories. “It should be safe but we have no studies yet,” she said.

The director advocated healthy diet of fruits, vegetables and pulses plus nuts along with lowering of cereals intake based on observation and clinical studies. Significantly, she asserted that the current surge in cases shows no difference in the way the virus is transmitting, in health complications or mortalities when compared to last year’s first wave.

Atal Incubation Centre-CCMB chief executive officer N. Madhusudhana Rao said both vaccines (Covishield and Covaxin) can effectively neutralise any variants prevailing in the country, including the double mutant. “Double mutant is prevalent up to 50% in Kerala and Maharashtra, but we do not have epidemiological or scientific evidence to say they are spreading more as the present surge could be due to a combination of super spreader events,” he said.

“The virus does mutate but 99% are nothing to be alarmed about. The sooner we can control the spread, the faster we can halt the mutations or there is a chance of more potent strain, which could even make the vaccines ineffective too. As of now, we do not need to fear,” he maintained. IICT principal scientist S. Ramakrishna said 95% protection comes from wearing masks always when outside and even inside home if there is no proper ventilation or there is a sick person around.



## ‘RT-PCR continues to be gold standard test’

CSIR-CCMB, IICT

28<sup>th</sup> April, 2021

The RT-PCR is an extremely sensitive test and continues to be the gold standard for detecting COVID. “The nasopharyngeal test is the best indicator, but depends on how the health worker takes the swab. The kits and equipment should be handled carefully as it amplifies many times. Error in any stage will make positive cases into false negatives,” explained Atal Incubation Centre-CCMB CEO Dr. N. Madhusudhana Rao on Wednesday.

From the beginning of the pandemic, the CCMB has trained many government healthcare personnel and others in conducting this test. “We are not sure whether everyone has the expertise to handle the swabs and also in using the equipment. It is taking two days for the samples to be collected and another two days for the results to come out during this second wave. We should also consider that from 100 samples, most labs are doing up to 500 samples now, and these heavy work loads are bound to be reflected on the personnel too,” he said.

Therefore, it is up to the diagnostic labs to ensure ‘quality’ control at each stage of sample collection, check whether the kits are active and not expired and equipment handling is done by well trained hands. “While it is possible some variants of concern can escape the RT-PCR tests, we do not have sufficient numbers to indicate so based on the available data,” he said in the virtual meeting organized by CSIR-IICT.

The CEO said that there was a notion that the new virus variant is going into the body from the mouth or nose quickly hence the RT-PCR tests were not able to detect but this is not true. “The ICMR cleared dry swab tests developed by the CCMB could be the game changer as it not only drastically brings down the costs, but takes less time and make it less complicated to handle so may be we can prevent mishandling,” he added.

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[Thehindu](https://www.thehindu.com)



CSIR-IICT,CCMB

28<sup>th</sup> April, 2021

## Live discussion on COVID, vaccination

**SPECIAL CORRESPONDENT**  
HYDERABAD

CSIR-Indian Institute of Chemical Technology (IICT) will be conducting a virtual online discussion on 'Campaign for COVID-19 appropriate behaviour and vaccination' in Telugu on Wednesday.

The participants include IICT director S. Chandrasekhar, ICMR-National Institute of Nutrition director R. Hemalatha, Atal Incubation Centre-CCMB director N. Madhusudana Rao, IICT senior principal scientist S. Ramakrishna and Nizam's Institute of Medical Sciences professor T. Gangadhar.

One can tune in on <http://www.youtube.com/csiriitchhyderabad/live> or <https://www.facebook.com/iictindia/live> at 11.30 a.m.

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The Hindu



## Less Expensive Drug for Corona Virus

# చౌక ధరలో కరోనా మందు బిళ్ల!

- రెమ్డెసివిర్ ఇంజక్షన్ కు ప్రత్యామ్నాయం • 3-6 నెలల్లో అందుబాటులోకి
- గాలి నుంచి ఆక్సిజన్ సేకరించే వెంటిలేటర్ సాంకేతికత నెలలో సిద్ధం
- 'ఈనాడు ముఖాముఖి'లో ఐఐసీటీ డైరెక్టర్ శ్రీవారి చంద్రశేఖర్



సిద్ధమవుతుంది. ఇవి అందుబాటులోకి వస్తే అనేక నమస్కరణకు పరిష్కారం లభిస్తుంది. అలానే రెడ్డిస్ పొందే షన్ అర్థిక సహాయంతో సరి కొత్త మాస్క్ టెక్నాలజీని రూపొందించాం. ఈ మాస్క్ మల్టీలేయర్ గా ఉంటుంది. దీనిపై ప్రతేకంగా తయారు చేసిన కెమికల్ వాడం. మాస్క్ పై కరోనా వైరస్ పడితే ఈ కెమికల్ వెంటనే నాశనం చేస్తుంది. 90 సార్లు ఈ మాస్క్ ను ఉతికి ఉపయోగించవచ్చు. వివిధ సంస్థలతో ఇలాంటివి లక్ష తయారుచేసి గ్రామీణ ప్రాంతాల్లో పంపిణీ చేయించాం. ఏ సేవా సంస్థ ముందుకు వచ్చినా ఈ టెక్నాలజీ ఇవ్వడానికి సిద్ధంగా ఉన్నాం.

సంస్థలతో ఇలాంటివి లక్ష తయారుచేసి గ్రామీణ ప్రాంతాల్లో పంపిణీ చేయించాం. ఏ సేవా సంస్థ ముందుకు వచ్చినా ఈ టెక్నాలజీ ఇవ్వడానికి సిద్ధంగా ఉన్నాం.

**?** వైద్యులకు తద్దాటుగా ఉండేందుకు సరికొత్త మాస్క్ ల తయారీ ఎంతవరకు వచ్చింది?

రోగులకు చికిత్స అందించే క్రమంలో సాధారణ మాస్క్ లతో రక్షణ లభించక అనేకమంది వైద్యులు, సిబ్బంది కరోనా బారినపడుతున్నారు. ఈ నేపథ్యంలో బెంగళూరు కంపెనీతో కలిసి వైద్యుల కోసం ప్రత్యేక మాస్క్ ల తయారీ టెక్నాలజీ మీద దృష్టిపెట్టాం. అనేక లేయర్లతో ఉండే ఈ మాస్క్ మధ్యలో ఆక్సిజన్ ఫిల్టర్ కు చిన్న ప్యాన్ ఏర్పాటు చేస్తున్నాం. ఈ వ్యవస్థ గాలిలో ఆక్సిజన్ను మాస్క్ లోపలికి పంపిస్తుంది. దీంతో ఇది దరించినవారికి ఆక్సిజన్ సులభంగా అందుతుంది. వారు రోజుల్లో ఈ టెక్నాలజీ సిద్ధమవుతుంది.

ఈనాడు-సీటీ ఐ్యార్ ప్రధాన ప్రతినిధి

దేశంలో కరోనా రోగులకు రెమ్డెసివిర్ ఇంజక్షన్ కొరత, అధిక ధరలు, మరోవైపు నిండుకుంటున్న ఆక్సిజన్ నిల్వలు ప్రధాన సమస్యలుగా మారాయి. ఇలాంటి పరిస్థితిలో రెమ్డెసివిర్ కు ప్రత్యామ్నాయంగా మందు బిళ్ల రూపంలో ఉండే చౌకైన టెషడం కొద్ది నెలల్లోనే అందుబాటులోకి వచ్చే అవకాశం ఉందని హైదరాబాద్ లోని ఇండియన్ ఇన్ స్టిట్యూట్ ఆఫ్ కెమికల్ టెక్నాలజీ (సీఎస్ఐఆర్-ఐఐసీటీ) డైరెక్టర్ శ్రీవారి చంద్రశేఖర్ తెలిపారు. గాలి నుంచి ఆక్సిజన్ సేకరించే వెంటిలేటర్ సాంకేతికత సిద్ధమవుతోందన్నారు. ఇంకా వైద్యుల కోసం ప్రత్యేకంగా ఆక్సిజన్ మాస్క్ తయారీతో పాటు కరోనా నిరోధానికి ఐఐసీటీ చేపట్టిన వివిధ పరిశోధనలు, వాటి ప్రయోజనాలపై మంగళవారం 'ఈనాడు'కు ఇచ్చిన ముఖాముఖిలో తొలిసారి వివరించారు.

**?** రెమ్డెసివిర్ ఇంజక్షన్ కొరతతో కరోనా రోగులు తీవ్ర ఇబ్బందులు పడుతున్నారు. ధర కూడా సామాన్యులకు అందుబాటులో లేదు. దీనికి ప్రత్యామ్నాయం లేదా?

కరోనా చికిత్సలో రెమ్డెసివిర్ ఇంజక్షన్ కు ప్రత్యా

కరోనా వ్యాక్సిన్ రూపకల్పనలో భారత్ బయో టెక్, సీరం సంస్థలకు ఐఐసీటీ ఎలాంటి తద్దాటు అందించింది?

భారత్ బయో టెక్ రూపొందించిన కోవాగ్జిన్ ప్రభావాన్ని పెంచేందుకు ఓ సహాయ టెషడం (అడ్జువెంట్) సాంకేతికతను రూపొందించి అందజేశాం. భారత్ బయో టెక్ ఈ టెక్నాలజీని రెండు సంస్థలకు అందజేసి వాటి నుంచి ఆ రసాయనాన్ని పొందుతోంది. దీనిని వ్యాక్సిన్ లో కలపడం వల్ల దాని ప్రభావం చాలా రోజులు ఉంటుంది. కొవిషీల్డ్ టీకా తయారు చేస్తున్న సీరం సంస్థ ఇదే కెమికల్ ను ఇతర దేశాల నుంచి దిగుమతి చేసుకుంటోంది. సీరం సంస్థ కోరితే ఈ టెక్నాలజీ ఇవ్వడానికి సిద్ధంగా ఉన్నాం. వారికి ఏ రకంగా తద్దాటు కావా లన్నా అందజేస్తాం.

మూయంగా మందుబిళ్ల రూపంలో టెషడం తయారీకి అమెరికా సంస్థ మెర్క్ ఓక పార్కులా రూపొందించింది. దీనిని ఉపయోగించి కోస్టల్ ఆఫ్ సైంటిఫిక్ అండ్ ఇండస్ట్రియల్ రీసెర్చ్ (సీఎస్ఐఆర్) అధ్యర్థం

లోని నేషనల్ ఇన్ స్టిట్యూట్ ఫర్ ఇంటర్ డిస్ ప్లినరీ సైన్స్ అండ్ టెక్నాలజీ (ఎన్ఐఐఎస్ఐటీ)-తిరువనంతపురం ఓ టెషడాన్ని తయారు చేస్తోంది. దీనిని అతి తక్కువ ధరకు దేశం అంతటా అందుబాటులోకి తెచ్చేందుకు ప్రయత్నాలు జరుగుతున్నాయి. ప్రస్తుతం ఫేజ్ 2 పరిశోధన జరుగుతోంది. ఆ తరువాత దశ పరిశోధనలు పూర్తయి అమెరికా నుంచి అనుమతి లభిస్తే మూడు లేక ఆరు నెలల్లో ఈ మందు మార్కెట్లోకి వచ్చే అవకాశం ఉంది.

**?** గాలి నుంచి ఆక్సిజన్ సేకరించి అందించే వెంటిలేటర్ మాస్క్ లపై దృష్టిపెట్టారు. ఈ ప్రయోగం ఎంతవరకు వచ్చింది?

గాలి నుంచి ఆక్సిజన్ను సేకరించి శుద్ధి చేసి రోగికి అందించే వెంటిలేటర్ తయారీపై డెహ్రాడూన్ లోని ఇండియన్ ఇన్ స్టిట్యూట్ ఆఫ్ ప్రెటోలియం టెక్నాలజీ సంస్థ, చండీగడ్ లోని సెంట్రల్ సైంటిఫిక్ ఇన్ స్టిట్యూట్ కలిసి దృష్టిపెట్టాయి. ఈ ప్రయోగంలో ఐఐసీటీ కూడా భాగమైంది. నెల రోజుల్లో ఈ టెక్నాలజీ



## Attempts to bring back Kombirei flower at Manipur's Yaralpat

CSIR-NEIST

27<sup>th</sup> April, 2021

Yaralpat (Manipur), April 27: In a memorable attempt to bring back Manipur's legendary seasonal flower-Kombirei or water Iris (*Iris Laevigata*) at its original habitat in a scientific manner, the Directorate of Environment & Climate Change in collaboration with local communities begins to transplant the saplings of the flower at Yaralpat, a shrinking wetland in Imphal east district.



The elders of Yaralpat Integrated Farming Cooperative Society Ltd(YIFCS) and Manipur Initiative for Conservation of Nature(MICON) besides others on Monday transplanted the Kombirei saplings at the specific areas of Yaralpat with technical support from Council of Scientific & industrial Research (CSIR)-Northeast Institute of Science & Technology (NEIST)Lamphelpat and local traditional knowledge partners from Khoidumpat, another wetland, according to officials.

Joint Director Dr T Brajakumar Singh of Directorate of Environment & Climate Change,said ,the step has been taken up as part of the continuing rejuvenation program of Yaralpat under the National Plan for Conservation of Aquatic Ecosystem and Climate Change Adaptation Approach.Yaralpat has been reported as Marsh or Swamp in the Wetlands (Conservation and Management) Rules, 2017. Based on the Survey of India edition (1923-42) compiled in 1955,the Mauve-blue flower species (Kombirei or Blue Iris *Laevigata* Fisch) is one of the historic habitats at Yaralpat, Dr T Brajakumar said.



Keeping these facts, the rejuvenation program of Yaralpat has been continuing since the last 7/8 years and migratory and resident birds have already been reported every year for the last 3/4 years, he added. Now, the rejuvenation and conservation work of Yaralpat wetland has been continuing in collaboration with MICON and YIFCS.

According to reports, Kombirei is a plant which grows on marshy land and its blooming season (April) signifies the end of the previous year and onset of a new year on the Meitei calendar. The flower is an essential item during Cheiraoba festival which usually falls in April every year in Manipur.

Due to various factors, Kombirei which once grew wild at Lamphelpat and Yaralpat wetlands in the outskirts of Imphal, now blooms only in the gardens and some unknown march areas. On the technical support, Principal Scientist Dr H Birkumar of CSIR-NEIST Lamphelpat, said, "The technical knowhow and scientific inputs are being provided from our side." "In true sense pure peat/bog materials are not available in the Yaralpat, I mean around 40-60 % original peat has been transformed into soil which is a big challenge for us in the present attempt of rejuvenation of our religiously associated Kombirei but high hopes are with us," he said.



## Novel antibody engineered product to treat COVID-19 cleared for clinical trials

CSIR-CCMB

27<sup>th</sup> April, 2021

‘VINCOV-19’ — a novel therapeutic antibody engineered product, which is a collaborative effort of the University of Hyderabad (UoH), CSIR-Centre for Cellular and Molecular Biology (CSIR-CCMB) and Vins Bioproducts Ltd, has got approval from the Drugs Controller General of India (DGCI) for clinical trials to test against the COVID-19 pandemic, on Tuesday.

VINCOV-19 is an antibody product obtained after immunisation of horses with inactivated SARS-CoV-2 virus in combination with adjuvants. The development of antibodies triggered in the horses are purified and further processed to generate highly pure antibody fragment-based product — Fab2.

Results have indicated that this product has a high neutralising capacity against SARS-CoV-2. Since neutralising antibodies could block the internalisation of SARS-CoV-2 to lung cells, it is postulated that their passive administration should render maximum clinical benefits if they are applied at the early stages of the disease, said an official spokesman of UoH. After signing the collaborative MoU between UoH, CCMB, and VINS on May 15 last year, the research groups at these organisations worked extensively towards standardisation of the viral propagation methodologies, bulk viral purification, immunological characterisation, and pre-clinical studies, which have shown promising results.

Pre-clinical trials for VINCOV-19, which began in October last year, were highly successful, showing potent virus neutralising capability. The next phase of clinical trials will involve over 300 COVID-19 patients spread across the country for examining the safety and efficacy of the antibodies. The clinical plan is to administer VINCOV-19 to patients with moderate to severe disease according to the published COVID-19 treatment guidelines as soon as they are



detected positive. This reinforces the idea that the therapeutic strategy, with equine antibodies, will play a significant role in managing COVID-19 and the ensuing pandemic, said the press release.

CEO of Vins Bioproducts Siddharth Daga is confident of bringing out the product to the market soon after the clinical trials. The UoH team is led by an associate professor at the department of animal biology, school of life sciences, Dr. Nooruddin Khan, specialising in the area of immunology, infection biology and vaccinology.

CSIR-CCMB principal scientist Dr. Krishnan Harinivas specialising in molecular virology and Vins Bioproducts' Dr. Krishna Mohan specialising in bioprocessing and product development are the key people involved in the work. UoH Vice-Chancellor Prof. Appa Rao Podile congratulated the team members and was happy that the industry-academia collaboration effort has yielded fruitful results in less than a year. He also thanked CSIR-CCMB director Rakesh Mishra and Vins CEO Mr. Daga for joining hands with UoH in developing 'VINCOV-19'.

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## Take the vaccine, urges CCMB director

CSIR-CCMB

26<sup>th</sup> April, 2021

With COVID-appropriate behavior — three-layer face masks, social distancing, hand hygiene and vaccination — along with current restrictions on movement or gatherings, it is quite possible to bring down the caseload in the next two-three weeks. “But, we could also see a lot of damage during this time,” said CSIR-Centre for Cellular & Molecular Biology (CCMB) Director Rakesh Mishra.



“We know how this virus spreads and how to stop this. With more vaccinations, we are hopeful of controlling the pandemic and perhaps, we can manage better and ensure there won’t be disastrous peaks like what we are experiencing now, in two months. The virus is smart and is certainly not going to vanish but could become like the common cold. We may be getting drugs to treat it sometime ahead,” he observed. Along with the ‘social vaccine’, the miracle of medical vaccines which have come out within a year should offer protection for several months and even up to a year, so, unless someone has been seriously ill in recent times, the jabs should be taken, he asserted.

In a virtual discussion thrown open to the public over the weekend, Dr. Mishra and fellow scientists Divya Tej S, and Karthik Bharadwaj explained about the nature of the coronavirus, transmission, mutations, common myths and vaccinations in more than an hour-long interaction. They were clear that the infections are predominantly transmitted from person to person through air and to a much lesser extent from touching steel or plastic surfaces where the virus can stay for at least a day.



COVID does not spread through air outside but indoors in closed environment of rooms, restaurants, cinema halls, etc., and certainly not through drinking water. More infections have been happening among the younger people this time because of the opening of educational institutions and other sectors of the economy as this section was not infected last year, they said.

The director said “masks can not only protect you from COVID-19 but also from many air-borne diseases, common cold, pollutants in this second wave. The symptoms and mortality rates among those infected is not significantly different from what was noticed in the first wave last year”.

“Avoid indoor places where there is no air circulation like restaurants, bars and cinemas. Even if you have to go, get out of there fast and strictly avoid any kind of parties whether a wedding or birthday, religious and political gatherings or events are a strict no-no. Don’t talk to anyone without mask outside. Don’t bother much about virus variants and take the vaccine as it is safer compared to the COVID-19 infection,” said Dr. Mishra.

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## COVID-19 vaccine: After plans with Moderna falls apart, Tata Group's healthcare venture in talks with J&J, AstraZeneca

CSIR-IGIB

26<sup>th</sup> April, 2021

Tata Group's healthcare company, Tata Medical & Diagnostics (TataMD) is in talks with COVID-19 vaccine makers — Johnson & Johnson (J&J), AstraZeneca for marketing and distribution tie-up.

The company was in talks with Moderna initially and the vaccine maker stated that they cannot supply vaccines until next year. The shortage in production due worker shortage, the company will be able to arrange export only by next year, stated an ET report.

After the company realized Moderna's position, TataMD decided to approach multiple vaccine manufacturers. In addition, the company is also looking for a tie-up with Apollo and Max Healthcare to supply medicines, oxygen and other medical supplies.

The company is in talks with 1mg to expand its reach by acquiring the company. The group is in discussion to acquire the company as well. TataMD is a company launched during the 2020 pandemic. It was to develop, launch and scale the availability of affordable diagnostics to treat COVID-19. The company's first product is the world's first commercially available CRISPR Cas-9 based COVID-19 test. It is powered by FELUDA from CSIR-IGIB, a leading Indian biosciences research institute.

In the future, TataMD CHECK diagnostics will be extended to other diseases and medical applications as a comprehensive diagnostic tool. This is where acquisition of 1mg comes into play.

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# फूलों की खुशबू से महकेंगे स्कूल

■ प्रदेश के स्कूलों में तैयार होंगे फ्लावर गार्डन, हिमालय जैव संपदा प्रौद्योगिकी संस्थान बच्चों को करवाएगा 10 दिवसीय कोर्स

पालमपुर, 25 अप्रैल (भृगु): ज्ञान की बगिया में अब फूलों की बगिया अपनी खुशबू बिखरेगी। प्रदेश के स्कूलों में फ्लावर गार्डन तैयार किए जाएंगे। इनमें ऐसे फूल लगाए जाएंगे, जो आमतौर पर प्रदेश में नहीं पाए जाते हैं, परंतु बाजार में इनकी ज्यादा मांग है। ऐसे में स्कूली बच्चों को स्कूल स्तर पर ही पुष्प उत्पादन से जोड़ने का प्रयास किया जाएगा। कक्षा छठी से 9वीं के विद्यार्थियों को इस कवायद से जोड़ा जाएगा।

हिमालय जैव संपदा प्रौद्योगिकी संस्थान इस कवायद को सिरे चढ़ाएगा। बच्चों को फ्लावर गार्डनिंग का 10 दिवसीय कोर्स भी करवाया जाएगा।

इसमें फूलों की खेती के तकनीकी ज्ञान से व्यावहारिक प्रशिक्षण भी उन्हें दिया जाएगा। बताया जा रहा है कि इस कवायद में केंद्रीय विद्यालयों तथा जवाहर नवोदय विद्यालयों के अतिरिक्त प्रदेश के सरकारी तथा निजी स्कूलों को भी शामिल किया जाएगा। इसके

लिए 100 स्कूलों को चिन्हित किया गया है। जानकारी अनुसार कुछ दिनों में हिमालय जैव संपदा प्रौद्योगिकी संस्थान जवाहर नवोदय विद्यालयों के साथ एम.ओ.यू. हस्ताक्षर कर रहा है वहीं इस दिशा में केंद्रीय विद्यालय भी आगे बढ़ रहे हैं। जहां इस कार्यक्रम को मूर्तरूप दिए जाने की प्रस्तावना

**वर्टिकल गार्डन  
भी होंगे  
विकसित**

हिमालय जैव संपदा प्रौद्योगिकी संस्थान प्रदेश के दूरिस्ट प्वाइंट पर वर्टिकल गार्डन भी विकसित करेगा, ताकि लोग गार्डनिंग के प्रति जागरूक हो सकें। ऐसे में वर्टिकल गार्डन जहां लोगों के लिए प्रेरणा का माध्यम बनेंगे वहीं एयर पॉल्यूशन को कम करने का माध्यम भी बनेंगे।

“ अरोमा मिशन के अतिरिक्त संस्थान द्वारा फ्लोरीकल्चर मिशन आरंभ किया गया है, ताकि प्रदेश में पुष्प उत्पादन को बढ़ावा दिया जाए। इस कड़ी में स्कूलों में भी गार्डन विकसित किए जाएंगे। इस दिशा में शीघ्र ही कार्य आरंभ किया जा रहा है।

- डॉ. संजय कुमार, निदेशक, हिमालय जैव संपदा प्रौद्योगिकी संस्थान पालमपुर

है। स्कूली बच्चों को संस्थान में लाकर तैयार किए गए गार्डन दिखाए जाएंगे।

कोविड-19 के चलते स्कूल बंद होने तथा ऑनलाइन क्लासिज जारी होने के कारण इस सारी कवायद को सिरे चढ़ाने के लिए ऑनलाइन कोर्स भी तैयार किए जा रहे हैं, ताकि विद्यार्थियों

को ऑनलाइन क्लासिज के माध्यम से ट्रेनिंग व तकनीकी ज्ञान दिया जा सके। प्रदेश में फूल उत्पादन को बढ़ावा देने के लिए हिमालय जैव संपदा प्रौद्योगिकी संस्थान पालमपुर ने फ्लोरीकल्चर मिशन आरंभ करने का निर्णय लिया है।



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