Press Information Bureau Government of India Ministry of Science & Technology

31 DEC 2021 1:07PM by PIB Delhi

Year-End Review-2021- Council of Scientific and Industrial Research

<u>PM delivers inaugural address at National Metrology Conclave organized to mark the 75th Foundation Day of</u> <u>CSIR-NPL</u>

Prime Minister Shri Narendra Modi delivered the inaugural address at the National Metrology Conclave 2021 organised by the Council of Scientific and Industrial Research -National Physical Laboratory (CSIR-NPL), New Delhi on its 75th year of inception.

CSIR-NPL, New Delhi, is one of the few premier laboratories established under CSIR before independence on January 04, 1947. As a beginning of the Platinum Jubilee year and to commemorate this special day as its NPL Foundation Day Celebrations, CSIR-NPL organised a National Metrology Conclave under the theme 'Metrology for the Inclusive Growth of the Nation'. Vice-President, CSIR and Union Minister of Science & Technology, Earth Sciences, and Health & Family Welfare, Dr Harsh Vardhan and Principal Scientific Advisor Dr K VijayRaghvan graced the function.

PM chairs meeting of CSIR Society

Hon'ble Prime Minister Shri Narendra Modi chaired a meeting of the CSIR Society on the 04th of June 2021 through videoconference. Speaking on the occasion, the Prime Minister remarked that the Corona pandemic has emerged as the biggest challenge of this century. But whenever there was a big humanitarian crisis in the past, science has prepared the way for a better future. He added that the basic nature of science is to create new strength by finding solutions and possibilities during crises. He urged CSIR to take society and industry along and move forward in a definite way with a roadmap.

COVID-19 Mitigation Initiatives

Launch of aerial delivery of Covid-19 vaccine through Octacopter drones in Jammu

Hon'ble Union Minister Dr Jitendra Singh, launched the aerial delivery of Covid-19 vaccine through Octacopter drones in Jammu on 27th November 2021. The Octacopter drones indigenously developed by CSIR-National Aerospace Laboratories (CSIR-NAL) are medium class BVLOS multi-copter UAV. The UAV is made out of lightweight carbon fiber foldable structure for ease of transportation and has unique features like autonomous guidance through dual redundant MEMS based digital Autopilot with advanced flight instrumentation systems. NAL Octacopter is integrated with Powerful onboard embedded computer and latest generation sensors for versatile applications like agricultural pesticide spraying, crop monitoring, mining survey, magnetic geo survey mapping etc. The demo was conducted from CSIR-IIIM, Jammu to Government Sub-District Hospital, Marh, Jammu in 15 minutes covering a distance of 15 kilometers. The first consignment of 50 vials of COVID vaccines was dropped by the Drone near the International Border (IB) in the Marh area.

<u>Swasth Vayu Non-invasive Ventilator developed by CSIR-NAL receives regulator nod; technology commercialized</u> with 6 private companies

CSIR-NAL scientists along with medical professionals from CSIR-IGIB came forward to address the shortages of ventilators in the beginning of the Covid-19 pandemic and indigenously designed and developed the non-invasive Bilevel Positive Airway Pressure Ventilator – SwasthVayu, with additional features to treat Covid-19 patients and make the country self-reliant. The expert committee constituted by Director General of Health Services, Government of India, has evaluated the performance of the device. The expert committee, after careful evaluation, concluded that SwasthVayu might be used on Covid-19 patients who require oxygen supplementation up to 35%. CSIR-NAL has commercialized this technology with six private companies and one of these companies (in the MSME category) has set up the production facilities for almost 300 units per week. CSIR-NAL bagged an order for supply of 1200 SwasthVayu machines to Delhi Government, and the execution & installation at various hospitals in Delhi.

<u>CSIR-IIP has developed, installed and commissioned 108 Oxygen Plants in partnership with DRDO and funding</u> <u>from PM-CARES</u>

CSIR-Indian Institute of Petroleum (CSIR-IIP), Dehradun, has developed oxygen enrichment units that can generate up to 500 litres per minute of medical-grade oxygen. This is based on an innovation that allows oxygen to be produced more efficiently and cheaply – using pressure vacuum swing adsorption technology (PVSA). It is cost effective and also has a small footprint and technology has been licensed to multiple industrial partners.

100-bedded Makeshift Hospital Inaugurated in Bhatinda

Punjab Chief Minister Captain Amarinder Singh virtually inaugurated a 100-bed makeshift Covid hospital at Talwandi Sabo in district Bathinda, Punjab, scaling up the state's preparedness for Covid-19 pandemic. The makeshift hospital for Covid patients was built within a very short span of a month & a half with the help of HPCL-Mittal Energy Ltd (HMEL) Refinery, Bathinda, under the guidelines of CSIR- Central Building Research Institute (CBRI), Roorkee.

CSIR-CBRI setup a 44-bedded makeshift hospital at Safdarjung Hospital

CSIR's Central Building Research Institute (CBRI) setup a 44-bedded makeshift hospital at Safdarjung Hospital in New Delhi, providing for management of COVID-19 patients. Hon'ble Minister for Health and Family Welfare Shri Mansukh Mandaviya, inaugurated the facility.

<u>CSIR-CSIO developed UV Disinfection technology to combat SARS-CoV-2 transferred to indigenous manufacturers</u> and also installed in the Central Hall of Parliament

CSIR-Central Scientific Instruments Organisation (CSIO) developed an UV-C air duct disinfection system. The disinfection system can be used in auditoriums, large conference rooms, classrooms, malls etc. which will provide a relatively safer environment for indoor activities in the current pandemic. The technology has been developed according to the requirements for deactivation of SARS COV-2 virus contained in an aerosol with necessary ventilation measures, necessary safety and user guidelines and tested Bio-safety standards etc. The CSIR-CSIO developed product is tested for more than 99 % disinfection and could be used as a retrofit solution to Air Handling Units (AHUs) of buildings, transport vehicles and other spin off applications. CSIR-CSIO has transferred the technology to 28 companies. The technology has been installed in the central hall of parliament for inactivation of the virus before the commencement of monsoon session of the parliament.

<u>CSIR-National Chemical Laboratory (CSIR-NCL), Pune, jointly with Reliance Industries Ltd. (RIL) and other</u> <u>companies recycle PPE waste into useful products</u>

In a proof-of-concept study, the CSIR-NCL team successfully demonstrated the lab-scale manufacture of moulded automotive products from the decontaminated PPE plastic waste (at M/s Niky Precision Engineers, Pune) by leveraging the existing recycling infrastructure available in Indian cities. CSIR-NCL and RIL have now signed an MoU to scale up the production, laying a path to take the concept to the national level. A pilot scale of 100 Kg in the Pune city area was successfully implemented by collaborating with Pune-based companies like M/s APPL Industries Limited, M/s SKYi Composites, M/s Harsh Deep Agro Products, M/s Urmila Polymers, M/s Jai Hind Autotech Pvt. Ltd., who produced the recycled goods.

Innovative Patient-Friendly Saline Gargle RT-PCR Testing Method developed by NEERI Nagpur

Scientists of Nagpur-based National Environmental Engineering Research Institute (NEERI) under CSIR have achieved another milestone in this journey, with the development of a 'Saline Gargle RT-PCR Method' for testing COVID-19 samples. The Saline Gargle method offers a bunch of attractive benefits, all rolled into one. It is simple, fast, cost-effective, patient-friendly and comfortable; it also offers instant results and is well-suited for rural and tribal areas, given minimal infrastructure

Role of CSIR-IICT in the Synthesis of Agonist molecule for use in COVAXIN developed by Bharat Biotech International Ltd.

Bharat Biotech International Ltd. (BBIL) emerged as the frontrunner in the development of indigenous vaccine for COVID-19, COVAXINTM. The vaccine developed by BBIL is a highly purified, whole virion, inactivated SARS-CoV2. The vaccine is formulated with Algel-IMDG, which contains chemisorbed TLR7/8 agonist onto aluminium hydroxide gel to generate the requisite type of immune responses. Owing to the significant role played by TLR7/8 agonist molecule in the performance of a vaccine, CSIR constituent lab, Indian Institute of Chemical Technology (IICT) based in Hyderabad, was approached by BBIL to develop the synthetic route for the agonist molecule with indigenous chemicals at an affordable price and with highest purity. This agonist molecule has aided BBIL to scale up the production of the adjuvant.

<u>CSIR and Tata MD partner to make COVID-19 detection more accessible across India by harnessing network of</u> <u>CSIR labs</u>

CSIR's apex scientific research organisation and Tata MD, the new healthcare venture from the Tata Group have announced a significant partnership to ramp up the COVID-19 testing capacity across Tier II and III towns as well as rural areas across India. CSIR and Tata MD are developing this capacity to manage any future surge in the COVID-19 testing requirements. The initiative will utilise CSIR's network of labs across India and help increase India's testing capacity in smaller locations in the country. CSIR and Tata MD will jointly develop the testing capacity and the RT-PCR CRISPR test will be done using the Tata MD CHECK SARS-CoV-2 test kits that are powered by FELUDA technology from CSIR-IGIB.

Major Achievements and Highlights

State-of-the-art Heli-borne survey technology for ground water management launched

Hon'ble Union Minister Dr Jitendra Singh, launched state-of-the-art Heli-borne survey technology for ground water management developed by CSIR-NGRI Hyderabad on 5th October 2021. Minister for Jal Shakti, Gajendra Singh Shekawat graced the occasion with his presence. To start with, the States of Rajasthan, Gujarat, Punjab and Haryana are being taken up for this latest heli-borne survey and the beginning was made today from Jodhpur in Rajasthan. Speaking on the occasion, Dr Jitendra Singh said that the water technologies of CSIR from source finding to water treatment would benefit millions of people across the country and positively contribute to Prime Minister Narendra Modi's "Har Ghar Nal Se Jal" as well as "doubling farmers' income" goals.

Indian Bio-Jet Fuel Technology Receives Formal Military Certification

CSIR-IIP Dehradun's home-grown technology to produce bio-jet fuel has been formally approved for use on military aircraft of the Indian Air Force (IAF). The provisional clearance (PC) certificate was handed over by Shri R. Kamalakannan, Group Director (AT&FOL), Centre for Military Airworthiness and Certification (CEMILAC) to Mr Saleem Akhtar Farooqui, Principal Scientist from CSIR-IIP in the presence of Group Captain Asheesh Shrivastava and Wing Commander A Sachan of the IAF and Mr R Shanumgavel of CEMILAC. This certification represents India's growing confidence in aviation biofuel sector and another step towards 'Atmanirbhar Bharat'.

<u>Union Minister Dr. Jitendra Singh launches India's first Virtual Science Lab for children under CSIR Jigyasa</u> <u>programme</u>

Hon'ble Union Minister Dr Jitendra Singh launched India's first Virtual Science Lab for children under CSIR Jigyasa programme, which will also connect students with scientists across the country.

Describing the Virtual Lab as a huge new beginning, Dr Jitendra Singh said this will not only take science to all segments of students in every corner of the country, but it is also in tune with the National Education Policy (NEP), where students are allowed to choose any subject and the concept of streams has been disbanded. He said, the new facility will immensely benefit students from Kendriya Vidyalayas, Navodaya Vidyalayas and Government Schools, and will help in catching them young.

Launch of India's First Indigenous Hydrogen Fuel Cell Bus

India's first indigenously developed and manufactured Hydrogen fuel cell bus was launched on 15 December 2021 in Pune. CSIR-National Chemical Laboratory (NCL) and CSIR-Central Electrochemical Research Institute (CECRI) developed the Hydrogen Fuel Cell Technology in collaboration with Sentient Labs, an R&D innovation lab incubated by KPIT Technologies.

DCGI gives approval for use of Hydroxyurea in Sickle Cell Anaemia treatment

The Drugs Controller General of India (DCGI) approved the use of Hydroxyurea in the treatment of Sickle Cell Anaemia (SCA). The CSIR's Sickle Cell Anaemia Mission is coordinated by the CSIR-Centre for Cellular and Molecular Biology (CCMB), Cipla, and with support from CSIR-Indian Institute of Integrative Medicine (IIIM). The committee of experts

constituted by Central Drug Standard Control Organisation (CDSCO) approved marketing of Hydroxyurea for treatment for SCA.

CSIR-IIP Partners with IndiGo to Manufacture Sustainable Aviation Fuel

CSIR's Indian Institute of Petroleum (IIP), Dehradun, and IndiGo have signed an agreement to manufacture and deploy Sustainable Aviation Fuel (SAF). It will help in controlling carbon emissions.

Hansa New Generation (NG) aircraft, designed and developed by CSIR-NAL, successfully make its maiden flight

Hansa New Generation (NG) aircraft, designed and developed by CSIR-National Aerospace Laboratories (NAL), Bangalore, successfully made its maiden flight on 3 September 2021. The aircraft took off from HAL airport at 2:09 PM and flew at an altitude of 4000 ft. and gained a speed of 80 knots before it made a successful landing after about 20 minutes.

MoUs exchanged between Aarhus University, Denmark and Geological Survey of Denmark and Greenland and CSIR-NGRI; CSIR-TKDL and Danish Patent and Trademark Office

During the visit of Prime Minister of Kingdom of Denmark to India, in the presence of the Hon'ble Prime Minister, Shri Narendra Modi, two CSIR agreements were exchanged between the two countries. The first was the MoU between CSIR-NGRI, Aarhus University, Denmark and Geological Survey of Denmark and Greenland on mapping of ground water resources and aquifers. The second was the TKDL Access Agreement between CSIR and Danish Patent and Trademark Office.

CSIR and NCSM sign a MoU for setting up of Science Museums at select CSIR Labs

A MoU was signed between CSIR and National Council of Science Museums (NCSM) in the presence of Shri G. Kishan Reddy, Union Minister of Culture, Tourism and DoNER and Union Minister of State (Independent Charge) Science & Technology, Dr Jitendra Singh. The MoU aims at setting up Science Museums at select CSIR Laboratories to promote scientific curiosity and awareness among the common people across all sections of society.

CSIR develops indigenous Mechanized Scavenging System for Sewage Maintenance

CSIR-CMERI, Durgapur developed indigenous Mechanized Scavenging System was successfully demonstrated at the premises of the CSIR-NPL. Two more versions of machine have been developed for tier-2 and tier-3 cities.

<u>CSIR-CMERI</u> demonstrates three Variants of advanced indigenous design and featured Mob Control Vehicle <u>prototypes</u>

In a view to elevate modern technical support to paramilitary forces engaged in maintaining law and order situation; train and equip them with advanced options, CSIR's Central Mechanical Engineering Research Institute (CMERI) demonstrated its three innovative variants 'Compact, Medium, Heavy' category of Mob Control Vehicles (MCVs) to a team of MHA recommended members under leadership of IG (RAF), CRPF. The demonstration was successfully carried out at Parade Ground, CRPF Group Centre, Gurugram recently.

<u>CSIR-CDRI and Marc Laboratories Ltd, India sign License agreement for developing drug for coronary and</u> <u>cerebral artery diseases</u>

CSIR-Central Drug Research Institute (CDRI), Lucknow is committed to support Pharma Cluster in Uttar Pradesh and has tied up with UP-based Marc Laboratories Pvt. Ltd., India, a young progressive enterprise with operating base in 13 other states. It has signed an agreement for the development of a synthetic compound S-007-867 as modulator of blood coagulation cascade, in particular as inhibitor of collagen induced platelet aggregation. This may be helpful in treating patient population of coronary and cerebral artery diseases. The institute has recently obtained the permission to initiate the Phase I clinical trials for the drug

Dr. Jitendra Singh inaugurated with one-day awareness cum training programme for farmers, Agriculture Start-Ups and young entrepreneurs in Jammu under CSIR- Aroma Mission Phase-II

Hon'ble Union Minister Dr. Jitendra Singh inaugurated the one-day awareness cum training programme for farmers under CSIR-Aroma Mission Phase-II at CSIR-Indian Institute of Integrative Medicine (IIIM), Jammu, and further During interacted with Agriculture Start-Ups, young entrepreneurs and farmers. Dr Jitendra Singh flagged off two mobile vans for awareness the Mission and inspected Stalls showcasing the processed products of aromatic plants from the UT. He also unveiled a song in Baderwahi language composed by artist Maloop Singh for mass awareness to attract farming community to embrace lavender farming.

CSIR celebrates 20 years of India's Traditional Knowledge Digital Library, the first of its kind globally

CSIR launched a new campaign of highlighting 80 success stories from the organization as it is set to turn 80 years old in 2022. This campaign was launched recently as CSIR's Traditional Knowledge Digital Library (TKDL) completes two decades of safeguarding India's Traditional Knowledge. To commemorate the two decades' journey, a webinar "Two Decades of TKDL - Connecting to the Future" was organized. The distinguished dignitaries who graced the program were Dr. Raghunath A. Mashelkar, Former DG, CSIR & Secretary, DSIR; Vd. Rajesh Kotecha, Secretary, Min of AYUSH; Shri Guruprasad Mohapatra, Secretary, DPIIT and Ms. BegonaVenero, Sr. Counsellor, Traditional Knowledge Division, WIPO, Geneva, and Dr. Shekhar C. Mande, DG, CSIR and Secretary, DSIR.

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