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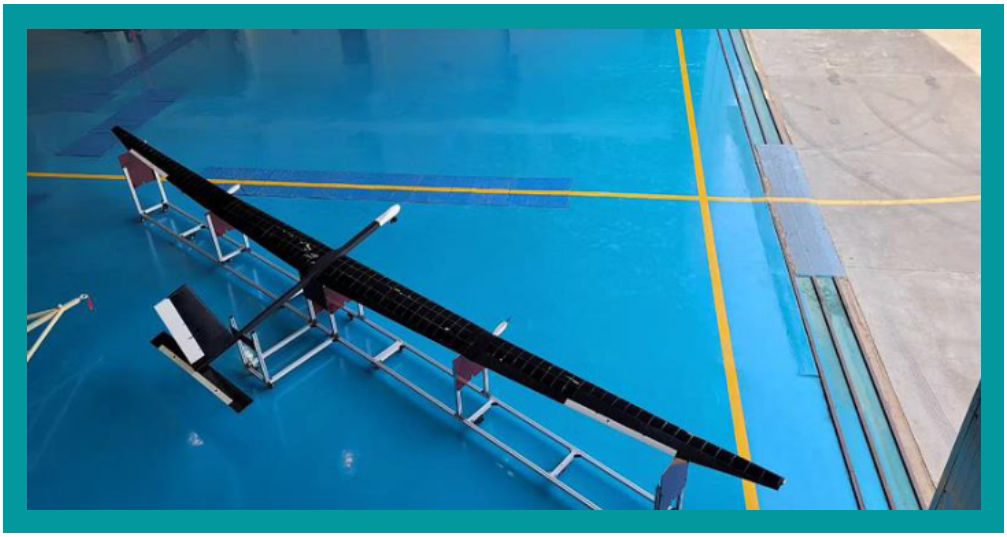
SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:



CSIR-NAL's new solar-powered UAV for border surveillance and improved communications

From carrying out under-the-radar border surveillance, to improving internet access to remote corners of the country, the Council of Scientific and Industrial Research-National Aerospace Laboratories' (CSIR-NAL's) futuristic solar-powered unmanned aerial vehicle (UAV) could soon make India one of the few elite nations to have its own High Altitude Platforms (HAP).

At the Wings India 2022 civil aviation event held last month in Hyderabad, NAL demonstrated a functional, sub-scale model of the HAP – an unmanned flying vehicle that runs on solar power during the day and high-density lithium ion batteries at night. The lightweight UAV is capable of flying at heights of over 22 kilometres, for up to 90 days, with payloads of over 16 to 20 kilograms. Speaking to ThePrint, Jitendra Jadhav, Director of NAL, explained that the HAP will work as a pseudo satellite for telecommunication applications in the 5G & 6G spectrum.

Indian laboratory develops new rare chemical to strengthen anti-doping testing

Union Sports Minister Anurag Thakur launched the indigenously developed six new and rare Reference Materials (RMs) which are the purest form of chemical required for anti-doping analysis in all WADA-accredited laboratories across the world. According to the Ministry of Youth Affairs and Sports, the six RMs have been developed in less than a year by (National Dope Testing Laboratory) NDTL in association with the National Institute of Pharmaceutical Education and Research (NIPER)-Guwahati and the CSIR-Indian Institute of Integrative Medicine (IIIM), Jammu.

With the creation of these RMs NDTL has earned itself the recognition of being one of the few labs in the world where such RMs have been developed. India has been importing RMs from Canada and Australia, however, with this scientific development India has indeed taken a step towards Atmanirbhar Bharat. Very soon, India will also be exporting these RMs to other countries.

India hails success of first 'steel-slag road'

The stretch of six-lane road experimentally paved with slag from steel-making in India has been proven to withstand the thousands of heavy trucks using the road daily, even though the surface is 30% shallower than that of roads paved with natural aggregates.

Slag is made up of impurities melted out of the ore during the steel-making process. The trial, guided by the Central Road Research Institute (CSIR-CRRI) and sponsored by ArcelorMittal Nippon Steel (AM/NS), suggests that roads built with the abundant waste material mixed with bitumen could be 30% cheaper than conventional paving, and could reduce the unsustainable mining of sand and gravel. The work of slag-paving lanes began a year ago on a 1.2km stretch of road near the busy Haziri port in Surat, Gujarat state, with the final lane paved last month.

School students receive lessons on Video Editing

Under the CSIR Integrated Skill Initiative programme which is a national programme on skill development initiated by Council of Scientific and Industrial Research (CSIR), a workshop on 'Video Editing' was organised on a digital platform by CSIR- National Metallurgical Laboratory, Jamshedpur.

The workshop was planned to give an exposure to school students, teachers and other interested individuals to impart in-depth knowledge of tools and techniques required for video editing. The main objective of this program was to train teachers and school students on editing video in a comprehensive, innovative and easy way using professional video editing software. The highlights of this special event were: Basic approaches in video editing, Tools & techniques, Editing background, Sound effects and Noise cancellation.

CSIR-NAL showcases HAP, Hansa-NG and drone technologies at Wings India 2022

The Council of Scientific and Industrial Research-National Aerospace Laboratories (CSIR-NAL) has showcased its "solar powered high altitude long endurance unmanned aerial vehicle", or to give it a shorter name, the 'High Altitude Performance (HAP) Vehicle'. A functional demonstration of the CSIR-NAL's HAP was the cynosure of all eyes at the recently concluded Wings India 2022 civil aviation jamboree at Hyderabad.

The HAP is designed to fly at an altitude of 22 km and for a time span of up to 90 days. The HAP platform will be an ideal vehicle as a "pseudo satellite", with a higher performance, lower launch cost and the added flexibility of being equipped for a re-launch.

CSIR-NAL also showcased its autonomous formation flight demonstration of its "Octacopter drone". Three MSMEs (Micro, Small & Medium Enterprises) have signed licensing agreements with CSIR-NAL for the drones, for use in a variety of applications including geo exploration, agriculture and floriculture survey, last-mile delivery, etc.

National Workshop On Probiotic Bifidobacteria Held At CFTRI

A two-day National workshop on "Bifidobacterial Probiotics: Supplementation through Fermented Food" was held at CSIR-Central Food Technological Research Institute, Mysuru.

Speaking on the occasion, scientist emphasized the role of Bifidobacteria in the development of the new-born child and maintaining gut microbial homoeostasis in the entire life of the individual and its potential to immunise humans from common cold to cancer.

In the Indian market, none of the probiotics products are meant for colon health, since most of probiotics are lactobacilli based that colonise only in small intestines. Keeping this in mind, CSIR-CFTRI has already developed two different probiotic products, "BIFIDOCURD and Bifidobacteria enriched soya curd" which are ready for Technology Transfer.

Efficacy of Polyvenom found to be low and varying with region

Scientists at the Hyderabad-based CSIR-CCMB's Laboratory for Conservation of Endangered Species (LaCONES) has found that the response of polyvenom to saw-scaled viper bites was low and also differed based on geographic regions.

Third generation antivenomics study on bound and unbound venom toxins of saw-scaled viper venom from Goa and Tamil Nadu showed that the immunoretained capacity of antivenom against the Tamil Nadu sample was 140.6g and Goa was 125.1g. The immunorecognition sites of antivenom saturated at a lower antivenom-venom ratio for Goa than for TN. The researchers said that the unbound toxins identified in the study could be targeted to see if it improved the effectiveness of the antivenom.

Antivenom makers procure over 80% of venom from Irula cooperative society based in Mahabalipuram in TN for PAV. Low effectiveness of polyvenom could be high due to intra-specific venom variation reported in spectacled cobra, Russell's viper and saw-scaled viper. A recent study suggested polyvenom showed batch-to-batch variation with a varied affinity towards 'big-four' venoms.

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Innovations and Contributions by CSIR labs

In this issue:

New device to wipe out COVID threat from enclosed spaces

Rural innovator Narishma Chary Mandaji has come up with 'Instashield', a medical device with Centre for Cellular & Molecular Biology (CCMB)-approved virus attenuation technology. It can disable viruses with up to 99.9% efficacy in enclosed spaces, in air, and on surface, heclaims.Instashield is a plug and play device based on an electron-based technology producing hypercharge high velocity electrons, which interact with the negative seeking s-protein of the corona family of viruses, thus, reducing infectivity and preventing air and surface-borne transmission of the corona family of viruses, he explained. A single device has an effective coverage area starting 5,000 sq.ft, activates within 18 minutes and within 120 minutes, n entire room can be covered, said Instashield co-promoter and director Hitesh M. Patel, in a press release.

LaCONES finds that Indian frogs are also being affected by Bd fungus

The study by researchers at CSIR-CCMB Laboratory for Conservation of Endangered Species (LaCONES) says that the fungus batrachochytrium dendrobatidis (Bd), responsible for the amphibian apocalypse in the West in the past few decades is seen in almost 75% of frog species in India.Visible impact of the fungus is not known as there is no monitoring of frog population and no massive deaths in water bodies reported in India unlike in South America, Australia and Europe.

Researchers collected samples over six years from several places, including Araku in Andhra Pradesh, the Himalayas, Nicobar islands, Western Ghats and other regions of the country, representing approximately 25% of India's total frog species. Their findings highlight that Bd fungus in Asia is an important wildlife disease and needs focused research.

CCMB studies the side effects of cholesterol-lowering drug to long-term users

A recent work by Prof. Amitabha Chattopadhyay's group at the CSIR-Centre for Cellular and Molecular Biology (CCMB) showed that statins could induce changes in the architecture of cells, possibly leading to the side effects.

Statins are one of the top selling drugs worldwide and are used to lower cholesterol. These drugs act by inhibiting a key enzyme (HMG-CoA Reductase) needed for making cholesterol in our body. Yet, statins have been reported to give rise to severe side effects to long-term users, but the molecular basis of these side effects is not yet clear.

A cell's architecture called cytoskeleton is made of proteins like actins that form polymers. These help the cells maintain their shape and size. Prof. Chattopadhyay's study showed that statins could induce polymerisation of cytoskeleton, in addition to cholesterol lowering.

Kangra tea to get European GI tag

The European markets will soon be opened for the distinct flavored Kangra tea, after it gets the Geographical Indication (GI) tag from the European Commission.

The development and cultivation of Kangra tea is being promoted and looked after by four departments, namely, the Tea Board of India Regional office Palampur, the cooperative and agriculture departments of the state and CSIR, the CSIR-IHBT Palampur and the Chaudhary Sarwan Kumar Agriculture University, Palampur. According to a government spokesman, Kangra tea was accorded the status of Geographical Indication Tag in India in 2005. He said that more than one lakh plants were provided to tea growers in 2021-22 and an area of 5.6 hectares was brought under fresh plantation.

CSIR-IIIM distributes ornamental plants in Pulwama

CSIR-IIIM in association with CSIR Floriculture Mission organised a programme for distribution of ornamental plant species under the vertical "Development of Floriculture Gardens in Schools/ Colleges" at CSIR-IIIM Field Station Pulwama.

Dr Zabeer Ahmed, Head, CSIR-IIIM, Srinagar took stock of the activities being carried out at the Field Station and complimented the team of CSIR Floriculture Mission for their efforts in successful implementation of various activities under the Mission in J&K with active collaboration of local stakeholders/ entrepreneurs and line departments.

CFTRI food technology school to get Government support

The Minister of Information Technology-Biotechnology, Higher Education, Science and Technology Dr. C. N. Ashwathnarayan said that the State Government would fully support the CSIR-Central Food Technological Research Institute (CFTRI), Mysuru, to set up a finishing school in the area of food technology.

He was speaking after visiting the CFTRI campus last evening where he inspected the over 40 products and technologies developed by the premier food technology institute. He was impressed by the 'ragi muddle'-making machine and dosa-making machine and called the innovations path-breaking. He even savoured the dosa and 'ragi muddle'. The Minister participated in the presentation of prototypes of various machines foe over three hours and his attention was drawn to the efforts of the CFTRI in augmenting the income of rural women and self-help groups.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

India makes strides in carbon capture technology

As countries are making efforts to go for 'net zero' emissions by 2050, Indian institutions have started coming out with different solutions to deal with the problem of climate change through mitigation. Scientists from the CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad have computationally designed a hybrid material which can absorb methane and convert it to clean Hydrogen in what could be a significant step to deal with climate-damaging greenhouse gas (GHG) whereas Indian Institute of Technology (IIT) Guwahati has partnered with NTPC Limited to design and develop a highly energy-efficient system for CO2 capture from power plants.

The scientists at IICT Hyderabad, have simulated a process of capturing carbon dioxide in-situ and converting it to high purity hydrogen from non-fuel grade bio-ethanol. Releasing their findings, the ministry of science & technology said that the scientists have designed a facility that can test such materials and help further carbon capture research at the institute.

Cryo-transmission electron microscope launched at CCMB

The state-of-the-art cryo-transmission electron microscope at the Centre for Cellular and Molecular Biology (CCMB) was inaugurated by Dr Shekhar Mande, Director-General, Council of Scientific and Industrial Research (CSIR). According to a release, Thermo Fisher Scientific cutting-edge cryo-transmission electron microscope supports advanced research and will help scientists to accelerate potential cures, drug discoveries and diagnostic research. The facility will be accessible to researchers in CCMB, other CSIR labs as well as those from other institutes, universities, pharma and biotech companies across the country. Thermo Fisher solutions deployed at the new facility also feature a suite of automation and sample-handling technology, increasing ease of use and ensuring the maximum amount of high-quality data that can be collected for each sample.

Central team led by S&T Minister Dr. Jitendra Singh takes stock of arrangements at Palli

A high level central team comprising of senior officers, led by Union Minister Dr Jitendra Singh visited the Palli panchayat in the Samba district of Jammu which is the venue of Prime Minister Narendra Modi's rally on 24 April. The "Panchayti Raj Diwas" this year is being organised at Palli by the Union Ministry of Panchayati Raj in collaboration with the Union Ministry of Science & Technology, the Department of Biotechnology and the Council of Scientific and Industrial Research(CSIR).

Speaking to media after the visit, Dr Jitendra Singh said, the choice of Palli Panchayat as the venue of the national level Panchayati Raj Diwas indicates the high priority given by Prime Minister Narendra Modi to Jammu & Kashmir and the Modi government's focus to strengthen Panchayati Raj Institutions (PRIs) in the Union Territory. He said, Prime Minister Modi will be undertaking this visit for the first time after the first-ever election to the District Development Councils held in Jammu & Kashmir 70 years after independence.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Kazi Nazrul University students on industrial visit to CSIR-NML

As part of the Centre's CSIR Integrated Skill Initiative, the students of Kazi Nazrul University, Asansol, visited the CSIR-National Metallurgical Laboratory (CSIR-NML) in Jamshedpur. The visiting team comprised of 18 students from the Metallurgical Engineering department of Kazi Nazrul University and two professors. The two-day programme was aimed at making students aware of the state-of-the-art facilities and infrastructure that CSIR-NML offers and also about the various categories of skill training conducted by CSIR-NML.

Students were given an overview of various kinds of collaborative research being carried out in the main research divisions of CSIR-NML, including Metal Extraction and Recycling (MER) Division, Materials Engineering (MTE) Division, Advanced Materials and Processes (AMP) Division, Analytical and Applied Chemistry (AAC) Division and Minerals Processing (MNP) Division.

New research in rare earth minerals could lead to local manufacturing boost

The new Lynas Rare Earths Processing Facility in Kalgoorlie, WA has recently received Environmental Approval, which will enable the manufacture of many high-tech products. Additionally, newly funded research at the University of South Australia could further transform the way rare earth elements and other vital battery metals are recovered from the earth, enabling efficient extraction with decreased environmental footprint. This international research collaboration includes the Council of Scientific and Industrial Research – Institute of Minerals and Materials Technology (CSIR – IMMT), Kalinga Institute of Industrial Technology (KIIT), and Indian Institute of Technology (IIT) as research partners, together with InnovEco Australia and Care of Our Environment (COOE) as translation partners.

'Quality of drinking water better now'

The recent initiatives of the state government to provide potable water to every household have started bearing fruits. People residing even in areas contaminated with arsenic, fluoride and iron are getting clean water these days.

State PHED secretary Jitendra Srivastava said the issue of quality in water and meagre coverage of piped water supply prompted the government to devise its ambitious 'Har Ghar Nal Ka Jal' scheme in 2016. Along with it, a detailed diagnostic process was undertaken for mapping the magnitude of chemical contamination in groundwater and subsequently the treatment technologies were scrutinized to see their efficiency in ensuring safe and potable water supply, he said.

"Furthermore, durability and user-friendly technology of water treatment, operational criteria of water treatment plants and reject management protocols were finalized and standardized by engaging expert agencies like CSIR-NEERI, Nagpur and UNICEF. Contractors were directed to sign MoUs with CSIR-approved technology Water Treatment Plant (WTP) manufacturing agencies," Srivastava said.

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Innovations and Contributions by CSIR labs

In this issue:

Scientists at CSIR-IICT Produce Clean H2 With Carbon Capture Efficiency of 99.58%

A group of scientists from CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad, have designed a hybrid material to simulate capturing carbon dioxide in-situ (onsite) and converting it into clean hydrogen from non-fuel grade bioethanol.

In a first for India, the scientists developed a fluidized bed reactor (FBR) facility in Hyderabad to perform sorption enhanced steam methane reforming (SESMR) to achieve clean hydrogen in its purest form. The facility was commissioned at CSIR-IICT in January this year.The facility was commissioned under a Mission Innovation Project supported by the Department of Science and Technology. The FBR system measures the performance of dual-functional materials for SESMR. The sorption enhanced steam methane reforming allows certain advantages of onsite carbon dioxide removal through sorbents, thereby overcoming the equilibrium restrictions of steam reforming, leading to clean hydrogen production.

NALSAR signs pact with CCMB's Atal Incubation Center

The NALSAR University of Law have entered into a memorandum of understanding with the Atal Incubation Center–CCMB to review/ advise on course, seminar, workshop curriculum, and structure of the special courses. Through this engagement, AIC-CCMB will offer lectures to students, free counselling on career/guidance etc. and IPR Clinics will be conducted by NALSAR not only for AIC-CCMB startup community but also for students and scientist groups of CSIR-CCMB. Both institutions will conduct periodical joint seminars as speakers, panel members, moderates etc. and such seminars shall be published in appropriate journals, according to a press release.

CFTRI resumes offline courses in food tech after two-year gap

After a gap of two years, the CSIR-Central Food Technological Research Institute (CFTRI), Mysuru has resumed their offline courses as the COVID-19 situation is returning to normal. The schedule of the 24 courses in various subject pertaining to food technology and processing for 2022-23 has been hosted on the Institute's website (www.cftri.res.in). These courses are of short duration, but intensive and packed with lectures and demonstrations. Faculty members having vast experience in specific areas of food science and technology will handle these courses. The demonstrations and practical classes are conducted in state-of-the-art laboratories and pilot plants of CFTRI.

For more details, interested candidates can visit the website or contact through telephone (0821-2514310) or e-mail (stc@cftri.res.in).

CSIR-IIIM's BioNEST-Bioincubator In Jammu inaugrated

Union Minister Dr Jitendra Singh inaugurated the CSIR-IIIM's BioNEST- Bioincubator at Jammu. Bio-NEST was launched by Biotechnology Industry Research Assistance Council (BIRAC) to foster the biotech innovation ecosystem in the country. Unlike Start-ups in the IT sector, enterprising ideas in the biotech sector need incubation support of a different kind where they need a landing space to test their ideas, run their operations, have access to high end instrumentations and locate in a place where they connect with other start-ups and mentors. Bio-NEST program provides support to establish bio-incubators either as a standalone entity or as a part of academia. Dr Jitendra Singh said that the 64 Start-ups registered with CSIR-IIIM, Jammu are based on people centric projects, 14 products have been developed and four have already reached the market.

CSIR-IMMT Successfully Conducts Two-day Integrated Skill Initiative Program

A 2-day CSIR Integrated Skill Initiative Program on "Electrochemical processing techniques and characterization for industrial applications" EPCIA-2022 was organised at CSIR-IMMT. The event aimed to provide an overview of academic and industrial advancements in various electrochemical processes, which includes lectures from eminent scientists from IMMT, live demonstrations, safety instructions and hands-on experiments planned for about 15 participants (Postgraduates, PhD scholars and young working professionals from universities and colleges of Odisha) to get a feel of existing techniques and applications in the domain of applied electrochemistry. The participants had an industrial visit to Mancheswar in order to provide exposure to understand actual industrial electrochemical operations for practical applications that are currently under commercial operations.

World's first packaged atmospheric mineral water

The first of its kind plant that makes packaged atmospheric mineral water from air has been set up in Hyderabad by Sachin Vaddavalli, founder of USATA Enterprises Private Limited. According to the company, Aria LifeWater is the world's first packaged atmospheric mineral water in a bottle.

Innovative technology is utilised to gather water vapour present in the air and condense it into the water, while pre-filters eliminate dust particles, contaminants, and heavy particles. The collected water is then filtered using a sophisticated water filtration system, which removes microbiological and chemical pollution. The water is then remineralized using CSIR-IICT patent technology before being bottled and packaged in Aria LifeWater's low-energy consumption bottling facility. While producing water, the water generator delivers air cooling to the plant, obviating the need for industrial air conditioning. The devices here can generate around 2,000 liters of water per day, while a single air water generator requires 10 kW per day.

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Innovations and Contributions by CSIR labs

In this issue:

CFTRI Resumes Offline Short-Term Training Programmes

With the COVID-19 situation getting milder, the CSIR-Central Food Technological Research Institute (CFTRI) is resuming all its short-term training courses in various subject areas of Food Technology and Food Processing. These offline Short Term Training (STC) programmes were suspended since past two years due to the pandemic. The schedule of the 24 courses for 2022-23 has been hosted on the Institute website (http://www.cftri.res.in/). These courses are of short duration, but intensive and packed with lectures and demonstrations. Faculty members having vast experience in specific areas of Food Science and Technology handle these courses. In addition to these courses, CFTRI also conducts tailor-made customised courses depending upon the requirement.

MoU between CSIR and iCreate to harness India's tech strength

An agreement has been signed between CSIR and iCreate, India's largest institution for transforming start-ups based on tech innovation into businesses, to harness the country's technological strength, the science and technology ministry said.

Gujarat Chief Minister Bhupendra Patel presided over the MoU signing between the state government's flagship technology incubator - iCreate (International Centre for Entrepreneurship and Technology) and the Council of Scientific and Industrial Research (CSIR), the premier research and development body of the Government of India.

Under the MoU, CSIR and iCreate intend to establish a collaborative support system for promising tech start-ups by making combined resources available for entrepreneurs and innovators in the country. The partnership will also catalyse scientific innovation and the marketability of high-tech start-ups, the ministry said in a statement.

IHBT develops nutrition-rich products

The Council of Scientific and Industrial Research (CSIR)-Institute of Himalayan Bioresource Technology (CSIR-IHBT), has developed various products containing iron, protein, and fiber especially to improve nutrition among children and women and to prevent the effects of malnutrition. Director CSIR-IHBT Dr. Sanjay Kumar informed that the institute had developed products containing iron, protein, and fiber for nutrition for children and women. CSIR-IHBT has developed various low-cost products to combat protein and micronutrient malnutrition by using cereals and pulses, microalgae and low-cost/underutilized agro-horticulture produce like the Shitake mushroom capsules rich in Vitamin D. Sanjay informed that they also organized a programme on the progress and future action plan of nutrition associated program coordinated by the institute under Poshan Abhiyan in collaboration with Directorate of Women and Child Development.

TSWREIS students get up, close and personal with scientists

Selected students of the Telangana State Social Welfare Residential Educational Institutions Society (TSWREIS) had a weeklong opportunity to interact with scientists of CSIR-Centre for Cellular and Molecular Biology (CCMB) and also carry out hands-on experiments and activities designed to help them understand the prescribed school syllabus. The students, were selected based on a quiz programme, as a part of the 'Milo CCMB' programme started during the COVID-19 pandemic when scientists made animated videos on some of their well-known work aligned with high school curricula and conducted online scientist interactions with students over six months. TSWREIS has a state-wide network of 235 schools, largely catering to female students from marginalised families.

Solving debate with DNA analysis

The genetic analysis of the excavated human skeletons from an old well in Ajnala town of Punjab has finally solved the debate about the source of these remains. The study done by scientists of the CSIR-Centre for Cellular and Molecular Biology (CCMB), Birbal Sahni Institute, Lucknow, Benaras Hindu University (BHU) and Punjab University's anthropologist J.S. Sehrawat has now established that these skeletons are of people from the Ganga plain region. Earlier in 2014 when these remains were excavated some historians believed that these skeletons belong to the people killed in riots during the partition of India and Pakistan. The other prevailing belief was these were skeletons of Indian soldiers killed by the British army during the revolt of 1857 in the Indian freedom struggle. The DNA analysis showed that the remains were not of people living in Punjab or Pakistan. Rather, the DNA sequences matched with people from U.P., Bihar and West Bengal. These results are consistent with the historical evidence that the 26th Native Bengal Infantry Battalion consisted of people from the eastern part of Bengal, Odisha, Bihar and Uttar Pradesh.

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Innovations and Contributions by CSIR labs

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Lemongrass revolution in the backward tribal belt of AP

The CSIR-Central Institute of Medical and Aromatic Plants (CIMAP) have started a project under the 'CSIR-Aroma Mission' to encourage lemongrass cultivation in the Srikakulam tribal belt areas of Andhra Pradesh. Under the Aroma Mission lavender is cultivated in Kashmir and lemongrass is grown in AP and Telangana. Earlier the CIMAP distributed 1,25,000 lemongrass slips to the farmers and the crops are shaping up well. Field visits are also carried out at Raiwada in Sarvakota. The tribals in Raiwada are now in the process of establishing a steam distillation unit on their own. Now, farmers from adjoining areas are coming forward to register under the CSIR-Aroma Mission, seeing Raiwada farmers' success.

Study confirms airborne transmission of coronavirus

A collaborative study by a group of scientists from the CSIR-CCMB, Hyderabad, and the CSIR-IMTECH, Chandigarh, along with hospitals in Hyderabad and Mohali, has confirmed the airborne transmission of SARS-CoV-2. The scientists analysed the genome content of coronavirus from the air samples collected from different areas occupied by Covid-19 patients. These included hospitals, closed rooms in which only Covid-19 patients spent a short period, and houses of home-quarantined Covid-19 patients.

They found that the virus could be frequently detected in the air around Covid-19 patients and that the positivity rate increased with the number of patients present on the premises. They found the virus in ICU and non-ICU sections of hospitals, suggesting that patients shed the virus in the air irrespective of the severity of infection. The study also found viable coronavirus in the air that could infect living cells, and these viruses could spread over an extended range of distances. Scientists still suggest wearing face masks to avoid the spread of coronavirus.

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CSIR-NBRI to develop biodiversity parks on the banks of Yamuna

As a part of India's 75th-anniversary celebrations, Yamuna's eastern and western banks would be transformed into biodiversity parks, providing more recreational opportunities for Delhi residents. The Delhi Development Authority (DDA) develops the park on nearly 108 hectares of land. DDA has signed an MoU with the Council of Scientific and Industrial Research (CSIR)-National Botanical Research Institute (NBRI) to conduct horticulture works at the Amrut Biodiversity Park. The plan is to depict the freedom struggle from the 1857 uprising to the Dandi March throughplant sculptures at the Biodiversity Park.

Corporate Training Programme at CSIR-NML

A five-day Corporate Training Programme was organized by CSIR-National Metallurgical Laboratory (CSIR-NML) from May 9 to May 13. The five-day program on 'Exposure Training on Metallic Pipes' was attended by delegates from different Central Institute of Petrochemicals Engineering & Technologycenters, including Bhubaneswar, Chennai, Bengaluru, Ranchi, Korba, Guwahati, Balasore, Baddi, Aurangabad, and Lucknow.The objective of the training program was to provide exposure to various metallic pipe components, which are frequently inspected and evaluated by different Central Institute of Petrochemicals Engineering & Technology (CIPET) centers for specific purposes.

Advanced technology in road construction

Union Minister Dr. Jitendra Singh dedicated the two pieces of equipment developed by CSIR for value addition in road construction and highways to the public. The two pieces of equipment developed by CSIR are 'Mobile Cold Mixer Cum Paver' for constructing blacktop layer using bitumen emulsion and 'Patch Fill Machine' for pothole repair along the road. On occasion, Dr. Jitendra Singh said that world-class indigenous technology is now available in India for road and highway construction.The Minister said Cold Mixer and Patch Fill Machine would play a significant role in building roads and Highways in the hilly states of India, particularly in the North-Eastern Region.

Effects of acute exposure to particulate matter on mortality

A new study on the effects of acute exposure to chemicals constituting the fine particulate matter (PM2.5) with mortality was conducted by a joint team of researchers from the Centre for Atmospheric Sciences at the Indian Institute of Technology (IIT)-Delhi, St. John's Medical College, Bengaluru, and the Council of Scientific and Industrial Research's National Physical Laboratory (CSIR-NPL).

The results showed that subspecies of nitrate, ammonium nitrate, chromium, ammonia, elementary carbon (EC), and organic carbon (OC) have a higher mortality impact than the total PM2.5 mass. Also, men were found to be at higher risk from nitrate, sulphate, and their ammonium compounds along with chromium. In comparison, women were found to be at higher risk from elementary carbon and organic carbon.

CSIR-IMMT Holds 15-day Awareness Programme On Maintaining Hygiene

The CSIR-IMMT Bhubaneswar organized a 15-day long initiative to create awareness on maintaining hygiene.Prof S Basu, Director, CSIR-IMMT Bhubaneswar, inaugurated the initiative at the Children's park, IMMT Bhubaneswar in which more than 150 people participated. The participants took part in the morning march, holding placards of creating awareness about environmental cleanliness. Under the leadership of Prof.Basu, all participants took the Swachhata pledge to maintain cleanliness and create awareness in the society to follow the same. Several events like essay writing, quiz, dancing, singing, drawing, fancy dress competitions etc. were being organized during this campaign.

CSIR-IMMT holds interactive meet with Startups

CSIR -Institute of Minerals and Materials Technology (IMMT) in association with the Innovative Technology Enabling Centre (InTEC) has organized an interaction meeting with startups at its campus.10 Odisha based and 1 Tamil Nadu based startup attended the meeting. The entrepreneurs shared the experience about their startup's initiatives and the challenges they are facing in developing the business module.

IMMT is providing an incubation centre to startups, giving them space and infrastructure for their initiative. Startups from various fields like technology, agriculture, drones, hospitality, battery, blockchain, mineral ore processing, waste management, and integrated resource management participated in this meeting.

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Innovations and Contributions by CSIR labs

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A safer way to stain nucleic acid by CDRI

CSIR-CDRI transferred the technology of the nucleic acid staining dye GreenR™ to a start-up company Geneto Protein Pvt. Ltd. (GPPL) on the occasion of National Technology Day. The dye GreenR™ has been developed by CDRI Senior Principal Scientist Dr. Atul Goel in collaboration with an industry partner Biotech Desk Pvt. Ltd. (BDPL), Hyderabad.

Dr. Goel informed that the product GreenR™ provides an economical alternative to commercially available dyes used to stain DNA/RNA, which are currently imported. It binds to all nucleic acids, including genomic DNA, PCR products, plasmids, and RNA and fluoresces under blue light or UV exposure. Dr. Shradha Goenka, Director of GenetoProtein Pvt. Ltd. (GPPL), plans to launch the Go GreenR™ campaign in which she urges scientists all over India to replace the use of mutagenic Ethidium bromide with the GreenR™ dye, which is safe to use and easy to dispose of.

Scientists at CSIR-NML develop corrosion-resistant rebar

Scientists at the CSIR-National Metallurgical Laboratory (NML) in Jamshedpur have developed a technology to produce corrosion-resistant rebar. Principal Scientist Ashok Kumar Mohanty said that rust is formed on rebar when it is exposed to water and moisture. If rusted rebar is used to make concrete, the longevity reduces as rusted rebar does not bond properly with cement. To solve this problem, CSIR-NML has developed a technology to produce corrosion-resistant rebar. Mohanty said the rebar is dipped in a water-based chemical for 1-2 seconds. Following this, a very thin phosphate layer is formed on it that prevents rusting.The technology is under trial at Tata Steel's Jamshedpur plant and has been transferred to Kolkata-based CRI Ltd. PTI BS SOM SOM.

Worldwide study on diabetes paves the way for risk prediction: CSIR

The results of a worldwide study on diabetes in which Hyderabad-based CSIR – Centre for Cellular and Molecular Biology (CSIR-CCMB) was involved, paves the way toward the development of ancestry-specific genetic risk scores for risk prediction in different populations. The CCMB said that the study has immense implications for Indians, where every sixth individual is a potential diabetic.

The study of diverse populations has shed new light on how genes contribute to Type-2 Diabetes. The study named DIAMANTE (DIAbetes Meta-Analysis of Trans-Ethnic association studies) co-led by Prof Andrew Morris at the University of Manchester is now published in Nature Genetics. The study compared the genomic DNA of 1.8 lakh people with Type-2 Diabetes against 11.6 lakh normal subjects from five ancestries - Europeans, East Asians, South Asians, Africans, and Hispanics - and identified a large number of genetic differences (Single Nucleotide Polymorphisms or SNPs) between patients and the normal subjects.

CFTRI serves a 'healthy' drink from coffee leaf

How about a coffee leaf brew? Sounds interesting. CSIR-CFTRI, Mysuru has developed a drink from coffee leaf which it claims can be used as an alternative to green tea or herbal tea. "It is an ideal health drink to consume at any time of the day. The brew can be prepared with water which can be filtered and consumed", the institute said.
Phytochemicals like phenolics, alkaloids, flavonoids, and anthocyanins in coffee leaves contribute to its health benefits. The coffee leaf brew mix that the institute has developed can be produced from the leaves that are pruned at the time of maintenance of the plants. They can be a good source of raw material for the drink, the scientists at the CFTRI said.

CFTRI brings out seven new technologies

CSIR-Central Food Technological Research Institute (CFTRI), on the occasion of the National Technology Day, announced the new technologies it has developed over the last year. Also, the CFTRI gave licenses to entrepreneurs for commercializing some of its technologies, thanks to the initiatives of the Technology Transfer and Business Development Department.

In total, seven new technologies, including gluten-free biscuits, gluten-free cookie cake, buckwheat noodles and pasta, multigrain nutri cookies, chikki with moringa, coffee brew mix, and high performance advanced oxidation process for STPs, greywater, industrial wastewaters (food and non-food), were developed by the R & D teams.

CSIR-CCMB announces first indigenous mRNA vaccine against COVID

CSIR-CCMB announced the success of 'proof of principle' of the first indigenous mRNA vaccine technology coming from a scientific institution stable in the country. The home-grown mRNA vaccine platform holds promise to deal with other infectious diseases like TB, Dengue, Malaria Chickungunya, rare genetic diseases and others.

CCMB Director Vinay Nandicoori said that the vaccine was developed within 10 months of having initiated the concept. "The vaccine is based on the Moderna model, but has been built with the information available in the open and our own technology and materials" he told a press conference at the CCMB. Dr. Nandicoori also said that "robust immune response" has been observed against the COVID spike protein in mice upon administration of two doses of the mRNA. The mRNA vaccine candidate is now undergoing pre-clinical Hamster challenge studies to evaluate the efficacy to protect against live virus infection. The scientists said the technology is ready to be transferred to any interested firm to take it to the next level of conducting human trials and bringing out the vaccine into the market after approval of the regulatory authorities concerned.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Three new food products launched by CSIR-CFTRI

From carrying out under-the-radar border surveillance, to improving internet access to remote corners of the country, the Council of Scientific and Industrial Research-National Aerospace Laboratories' (CSIR-NAL's) futuristic solar-powered unmanned aerial vehicle (UAV) could soon make India one of the few elite nations to have its own High Altitude Platforms (HAP).

At the Wings India 2022 civil aviation event held last month in Hyderabad, NAL demonstrated a functional, sub-scale model of the HAP – an unmanned flying vehicle that runs on solar power during the day and high-density lithium ion batteries at night. The lightweight UAV is capable of flying at heights of over 22 kilometres, for up to 90 days, with payloads of over 16 to 20 kilograms. Speaking to ThePrint, Jitendra Jadhav, Director of NAL, explained that the HAP will work as a pseudo satellite for telecommunication applications in the 5G & 6G spectrum.

Drone demo: Crowds at CFTRI witness use of drones in farm operations

A demonstration of drones in agriculture and farm operations was held at the Council of Scientific and Industrial Research (CSIR)-Central Food Technological Research Institute (CFTRI) as a part of TechBharat-2022. Union Minister of State for Science and Technology and Earth Science Jitendra Singh and Minister of State for Agriculture and Farmers' Welfare Shobha Karandlaje operated the drones to open the demonstration to the public. The two drones, NAL Octa-Med and NAL Octa-Agri have been designed by CSIR-National

Aerospace Laboratories (NAL), Bengaluru, are called Drone-based vaccine/ emergency medicine deliveries and have a payload of 10 kgs and 20 kgs. They have a maximum flying speed of 30 km and 36 km per hour and a maximum range of 20 km. They have a maximum launch altitude of 3 km and an operational altitude of fewer than 500 mts AGL.

CFTRI mobile food processing unit to take tech to farmers' doorsteps

The Council of Scientific and Industrial Research (CSIR)-Central Food Technological Research Institute (CFTRI), Mysuru, has launched a Mobile Food Processing and Demonstration Unit to take food processing technologies to the farmers' doorsteps. The unit was launched by Agricultural Minister B C Patil during the inaugural ceremony of the three-day TechBharat, an agri and food conclave cum expo organised by Laghu Udyog Bharati-Karnataka (LUB-K) and IMS Foundation, in association with CFTRI. "The unit has an objective of on-site demonstration of food processing techniques to farmers. It creates awareness of the advantages of food processing, particularly during excess production, and encourages the farmers to take up value addition at farm-level by converting their products into semi-finished or finished products," said Chief Scientist B V Sathyendra Rao.

CSIR-CCMB organizes Workshop on Reproductive Technologies in Wildlife Conservation at CSIR-IIIM

The CSIR-Centre organised a three-day workshop on Reproductive Technologies in Wildlife Conservation for Cellular and Molecular Biology (CCMB) - Laboratory for the Conservation of Endangered Species (LaCONES), Hyderabad at CSIR-Indian Institute of Integrative Medicine (IIIM), Srinagar. It is the first of the series of workshops planned to train professionals in J&K to take part and implement conservation programs successfully in the Union Territory. At the outset of the event, Dr. Karthikeyan, Chief Scientist, CSIR-CCMB, informed us that the workshop would emphasize the aspects of conservation breeding, reproductive physiology, wildlife endocrinology, bio-banking, and assisted reproductive technologies.

NAL's 'HANSA-NG' aircraft completes in-flight engine relight test

The CSIR-Centre organised a three-day workshop on Reproductive Technologies in Wildlife Conservation for Cellular and Molecular Biology (CCMB) - Laboratory for the Conservation of Endangered Species (LaCONES), Hyderabad at CSIR-Indian Institute of Integrative Medicine (IIIM), Srinagar. It is the first of the series of workshops planned to train professionals in J&K to take part and implement conservation programs successfully in the Union Territory. At the outset of the event, Dr. Karthikeyan, Chief Scientist, CSIR-CCMB, informed us that the workshop would emphasize the aspects of conservation breeding, reproductive physiology, wildlife endocrinology, bio-banking, and assisted reproductive technologies.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

AI-based iRASTE initiated first on Nagpur roads

A project named 'Intelligent Solutions for Road Safety through Technology and Engineering' (iRASTE) is being implemented in Nagpur city as a pilot project to reduce road accidents significantly. The project is being implemented with the help of a unique Artificial Intelligence (AI) approach, using its predictive power to identify risks on the road. The project was initiated by a collaboration between Intel India, IIIT Hyderabad, CSIR-Central Road Research Institute (CRRI), Mahindra & Mahindra, and Nagpur Municipal Corporation (NMC). The system can identify potential accident-causing and alert drivers about the same with the help of the Advance Driver Assistance System (ADAS). The project also aims to identify 'grey spots' by data analysis and mobility analysis by continuously monitoring dynamic risks on the entire road network.

India awaits ASTM approval for aviation biofuels

India is proceeding with the formalities of obtaining what is called the "ASTM D4054" certification to be able to mix indigenous aviation biofuels with Aviation Turbine Fuel (ATF) for commercial aviation. The certification is for establishing that the aviation biofuel itself, as well as the process of manufacturing it, both conform to ASTM D4054 standards. These standards have been set up by ASTM International (formerly, American Society for Testing and Materials), founded in 1898. The CSIR-IIP is the technology provider and thus it is the responsibility of the CSIR-IIP to secure the certification.

By the time the certification happens, a consortium of a public sector refiner in south India, Indian Institute of Petroleum and Engineers India Ltd would have already finalized a project to put up a demonstration plant capable of producing about 15,000 liters per day of sustainable aviation fuels (SAF) based on bio-derived sources.

CSIR-IIIM starts the first-ever lavender festival in India

CSIR-IIIM has kick-started a two-day lavender festival in Bhaderwah to promote lavender cultivation among the farmers here.Taking a cue from the US, Australia, and France, Jammu and Kashmir have become the first State/Union territory in the country to host a lavender festival and showcase the rich biodiversity of medicinal and aromatic plant.

The festival will bring people from this industry, academia, and farmers on the same page. Nodal Scientist Aroma Mission, CSIR-IIIM, Dr. Sumeet Gairola, said they would go to the fields and interact with the farmers. "They can discuss and understand their problems/expectations more closely. Also, new technologies can be explored to boost its production," Dr. Gairola added.

“Aromatic Marigold Day” organised by the CSIR-IHBT

The “Aromatic marigold day” was organized at the CSIR-IHBT, Palampur, to inspire Himachal farmers to grow marigolds. Representatives from over 50 cooperative societies, including 36 panchayats and 14 Nagar Nigam, and more than 1000 farmers within these societies participated in the event. Different sessions were organized in which information about the crop was provided. The main attraction was seed distribution, training, practical demonstration, and interaction with progressive aromatic marigold farmers from different Himachal Pradesh villages. Dr. Sanjay Kumar, Director, CSIR-IHBT, Palampur, said that the Himachal Pradesh is suitable for producing essential oil with preferred high-demand aromatic constituents in the international market.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-IICT installs 15 atmospheric water generators in Uttarakhand

Fifteen Atmospheric Water Generator (AWG) units of 60 litres per day capacity (10) and 150 litres per day capacity (5) each, were installed recently by a team of CSIR-IICT scientists led by chief scientist S. Sridhar in the remote community schools and colleges located in Dehradun, Rishikesh and Tehri districts of Uttarakhand where the groundwater is scarce.

The project is sponsored by THDC India Limited, Rishikesh, as part of the corporate social responsibility, while the CSIR-IICT designed AWGs were manufactured in collaboration with Maithri Aquatech, Hyderabad. This technology is based on the inverse Carnot cycle involving the condensation of pre-filtered humid air to water droplets using a refrigerant that undergoes compression and evaporation alternately. The water is remineralised using a proprietary salt mixture and post-treated by ultraviolet light for any secondary microbial contamination, followed by exposure to an activated carbon column for good taste.

CSIR-NML signs MoU with Pune-based firm for recycling of scrap

CSIR-National Metallurgical Laboratory (NML) has entered into an agreement with Recy Energy Pvt. Ltd., Pune to transfer a breakthrough technology for the recycling of scrap, waste, and used lithium Ion Batteries (LIB). Dr. S.K. Pal, head, research planning & business development division, CSIR-NML, and Dr. Masood Khajenoori, founder & CEO, Recy Energy Pvt. Ltd signed the regarding technology transfer agreement.

The burgeoning automotive and transport sector has been surging ahead worldwide, witnessing sharp growth in the realm of Lithium battery-based electrical vehicles across developed and emerging nations. India generates over 50,000 tonnes of lithium battery waste every year, which is expected to increase three-fold by 2025. While the customer's lucrative demands and stringent environmental regulations ensure the development of sustainable technology for Lithium battery recycling. Nonetheless, CSIR-NML comes up with a waste-to wealth creation technology that addresses all the global challenges that are prevailing at present.

Dissemination of CSIR Technologies for Rural Development

Recently CSIR-NIScPR has undertaken a major initiative for dissemination of CSIR technologies for creating livelihood opportunities in rural areas in the wake of situation created by COVID-19 pandemic. In this regard, a farmer-industry-scientist meet was organized at Lovraj Auditorium, CSIR-IIP Dehradun on 30 May 2022 to disseminate the Kisan Sabha App and Gur Bhatti Technology to the farmers.

The objective was to disseminate Kisan Sabha application developed by CSIR-NIScPR and Gur Bhatti Technology developed by CSIR-IIP Dehradun, for creating livelihood opportunities in rural areas; and also to develop the business opportunities for the farmers' livelihood creation and enhance their income. At the meet, scientists, industrialists, financers and farmers came together on a single platform to discuss all the opportunities and challenges.

'India becomes one of the largest exporters of lemongrass'

From being one of the largest importers of lemongrass a few years back, India has now become one of the largest exporters in the world, thanks to the 'Aroma Mission' project led by the CSIR-CIMAP, Lucknow.

According to Dr. Prabodh Kumar Trivedi, director of CISR-CIMAP, "About 1000 tonnes of lemongrass are produced every year, and out of it, 300 – 400 tonnes are exported. Thanks to the 'Aroma Mission' project led by CSIR-CIMAP, Lucknow. The mission also syncs with the PM's mission to make India 'Atmanirbhar Bharat,' as the Council of Scientific and Industrial Research (CSIR) has made important contributions to the establishment, fostering, and positioning of the country's essential oil- based aroma industry. It benefited the industry, farmers, and next-generation businesses, besides, also boosting the export of lemongrass over the time."

The oldest living seed plant on the verge of extinction: CSIR-NBRI study

Studies by the Council of Scientific and Industrial Research-National Botanical Research Institute (CSIR-NBRI) found out that the cycads are on the verge of extinction. Cycads are said to be the oldest living seed plant on Earth that have survived the three mass extinctions. The institute is working to ensure they survive through artificial reproduction, they said.

"Cycads have undergone huge transformations throughout their history and humans may be the only ones who can save them. They're on the verge of extinction, so we're working on artificial reproduction to keep them alive before they go extinct," said S K Barik, Director, CSIR-NBRI, Lucknow. "Cycads are one of the popular plants used in offices, hotels, and parks for beautification. It has a multi-million commercial market globally. Most of the demand is fulfilled by importing from Japan. If we can increase the number of Indian species in the market, we would too be able to commercialize it", said Dr. K J Singh, senior scientist, CSIR-NBRI, Lucknow.

CSIR-CCMB study reveals that menopause drug can fight malaria

A drug widely used for the treatment of post-menopausal symptoms and osteoporosis among women now has the potential to treat malaria. In a ground-breaking study, researchers from CSIR- Centre for Cellular and Molecular Biology (CCMB) have demonstrated that Bazedoxifene is anti-parasitic and inhibits Plasmodium falciparum, the unicellular protozoan parasite that causes malaria in humans.

The researchers, led by senior principal scientist Dr Puran Singh Sijwali, have shown in the study that Bazedoxifene has 'potent inhibitory activity against both susceptible and drugresistant strains of Plasmodium falciparum. Since Bazedoxifene is already in clinical use for the treatment of post-menopausal osteoporosis, the findings by the CCMB researchers have supported the need to repurpose the drug as an anti-malarial. The study was published in the American Society for Microbiology (ASM) journals Microbiology Spectrum on May 26.

Since the development of new drugs for malaria involves a lot of risk, time and expenditure, it was only natural to explore the possibility of repurposing existing drugs against the disease. In this direction, the CCMB group assessed Tamoxifen, Raloxifene and Bazedoxifene, which are Selective Estrogen Receptor Modulators (SERM), for the treatment and prevention of breast cancer and antibacterial, and have anti-parasitic activities.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Trisonic wind tunnel at NAL at the glory of 55 years of service

The CSIR-National Aerospace Laboratories (NAL) commemorated the 55 years of the 1.2-metre trisonic wind tunnel which is the only industrial wind tunnel in the country providing high-speed aerodynamics data for the national aerospace programmes in both civil and military sectors.

The facility was built in Bengaluru between 1963 and 67 by the Council of Scientific and Industrial Research (CSIR) and has been a test facility for many missiles, launch vehicles and aircraft developed by the Defence Research and Development Organization (DRDO) and Indian Space Research Organization (ISRO). Characterisation of ISRO's launch vehicles such as ASLV, PSLV, SLV, SSLV, GSLV, RLV, and Gaganyan programmes were also carried out at the facility. India's first Light Combat Aircraft (LCA-TEJAS) was conceived at this facility and many weapon integration programmes on LCA, Mirage-2000, Sukhoi-30, Jaguar, and MiG aircraft were also successfully carried out at NAL.

Manipur's rare lotus at NBRI

The CSIR-National Botanical Research Institute (NBRI) of Lucknow has now collected about 20 varieties of lotus flowers including the rare 108 petal lotus, usually found in Manipur.

According to Director, NBRI, Lucknow, Dr. S. K. Barik, a species of 108-petal lotus was collected from its natural habitat and planted in NBRI's garden where it is now growing naturally. NRBRI also planted 1000 petal lotus which is in the infant stage.

Besides its religious and cultural significance, lotus has a lot of nutritional value too. NBRI's focusses not only on expanding the number of varieties but also on improving its nutritional value, which is critical in the pharmaceutical industry. Even though it is a national flower to Indian's, it is currently grown only in a limited area. NBRI aims to popularise and scale up its commercialization in order to encourage people to grow more leading to more profits.

The institute has also planted the world's largest water lily in its garden. This giant Amazon water lily (Victoria amazonica) would soon be available for public viewing.

NEERI to set up emission testing lab for green crackers at Sivakasi

Fireworks manufacturers along with the CSIR-National Environmental Engineering Research Institute (NEERI) will soon set up an emission testing laboratory for green fireworks products at Sivakasi.

Around 800 units have entered into agreement with NEERI for producing green crackers and every unit is sending multiple products for testing to the NEERI's laboratory in Nagpur. Stating that NEERI has got only two chambers for testing fireworks products, president of Tamil Nadu Fireworks and Amorces Manufacturers' Association (TANFAMA), president P. Ganesan, told that the facility had the limitation in conducting test for only four products a day. Hence, there was delay in certification of the fireworks products.

"We have proposed to set up 10 chambers in Sivakasi, so that 20 products can be tested each day," Mr. Ganesan said. Till then, in order to help the manufacturers, NEERI along with TANFAMA has proposed to create a facility of lifting samples from the manufacturers at Sivakasi every week for sending them to Nagpur. Meanwhile, TANFAMA has organised a camp for signing memorandum of understanding with fireworks units in Sivakasi on June 9 at TANFAMA office building.

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Bricks from silica sand: Technology by CSIR-NIIST

Autokast Ltd., a ferrous foundry manufacturing unit in the public sector, is all set to begin the commercial production of eco-friendly bricks for the construction sector. It will make use of the technology developed by the Council of Scientific and Industrial Research-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) for making bricks from waste foundry sand, which is rich in silica. The CSIR-NIIST technology uses cement bonding and compression moulding technique to make bricks from waste sand.

The CSIR-NIIST has been conducting trials to fix various parameters before the commencement of commercial production. "A team from CSIR-NIIST, the technology partner of the project, is expected to visit Autokast shortly. They will make 3,000 bricks as part of transferring the technology," said Mr. Praviraj, managing director, Autokast Ltd.

CSIR-NIO to identify sites for restoration of corals along the Maharashtra coastline

In a mission to record and identify stressed coral zones along the Maharashtra coastline, the State Mangrove Cell has appointed the CSIR-National Institute of Oceanography (NIO) to conduct a baseline study to identify potential sites for restoration of corals. The Mangrove Cell signed an agreement with NIO under the India–United Nations Development Programme-Green Climate Fund (GOI-UNDP-GCF) project titled 'Enhancing Climate Resilience of India's Coastal Communities'.

Coral polyps are tiny, soft-bodied organisms that are relatives of jellyfish. Coral reefs are like underwater cities and support marine life. According to the UN environment programme, corals provide at least half a billion people with food security and livelihood. Coral reefs also act as 'wave breaks' between the sea and the coastline and minimize the impact of coastal erosion. In India, they garner the same protection as a tiger or elephant under Schedule I of the Wildlife Protection Act (WPA), 1972.

CSIR-NIO assures to complete the inspection of Ram Setu on time

The director of CSIR-NIO, Sunil Kumar Singh assured that the underwater survey and exploration of the Ram Setu in the seas at Rameshwaram in Tamil Nadu will be completed on time. The survey was initiated due to the debate about the authenticity, origin, structure, and timeline of Ram Setu after the controversial Sethusanudram Shipping Canal Project that would require the dredging of the Sethusamudram Sea between India and Sri Lanka. The survey expedition began in 2021 and may take two more years before it completes and comes out with its findings.

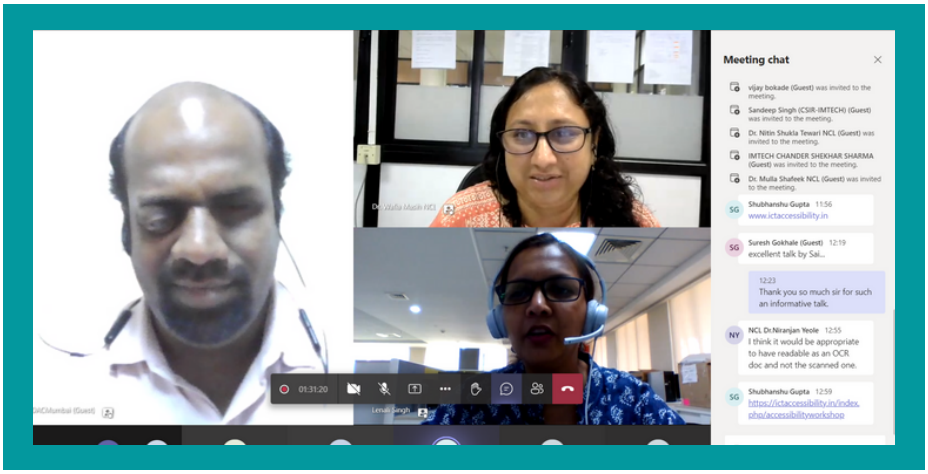
"CSIR-NIO will undertake drilling operations at the site of the Ram Setu in the seas at Rameshwaram in Tamil Nadu and collect samples to study the phenomenon. These samples will help in deciding the specific findings of the age of the Ram Setu and whether it is a natural or manmade structure. The research and exploration project on Ram Setu is expected to stretch for the next two years before it reaches completion," assured Singh.

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-NCL Organizes ICT Accessibility Awareness Talk.



CSIR-National Chemical Laboratory (CSIR-NCL), Pune, organized an online awareness session on "ICT (Information and Communication Technology) Accessibility and Standards" in which two experts from C-DAC gave talks on data accessibility. The session was organised to find out the importance of accessibility and the audience who would benefit from it. Dr. Ashish K. Lele, Director, CSIR-NCL, briefed on the importance of diversity, equity, and inclusiveness as the key aspects of any organizational ethics. He said that practicing inclusiveness is also essential from a business perspective since it helps to increase the customer base, the image, and the branding of the products and services. Dr. Lele highlighted the importance of data accessibility in realizing the Digital India vision.

Mr. Saidarshan Bhagat, Senior Technical Officer, C-DAC, Mumbai, talked about "Awareness towards digital accessibility and assistive technologies. " Mr. Sai explained the concept of accessibility and its purpose to provide freedom to the user. Talking about web accessibility, he encouraged the listeners to visit the site of Knowledge and Resource Centre for Accessibility in ICT (KAI) at https://ictaccessibility.in/. Mr. Bhagat himself is a blind person and could explain the need of accessibility on websites to show that even a disable person like him should be able to access it like any other normal person. Through his presentation he directed how a disable person like him and a deaf and dumb person should easily be able to order food, clothes online and also get to know the research and technology that is being carried out in the nation. Mr. Bhagat's presentation was emphasised on inclusitivity to each and every citizen of India in digital or other wise.

The technical details of how the documents can be made accessible on the websites was made by Mr. Shubhanshu Gupta, Principal Technical Officer, C-DAC, Pune. The Associate Director of the C-DAC, Ms. Lenali Singh informed the audience of the various workshops and events organised by C-DAC to create awareness on accessibility. Dr. Wafia Masih, Senior Principal Scientist, CSIR-NCL coordinated the entire event and also delivered a vote of thanks.

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

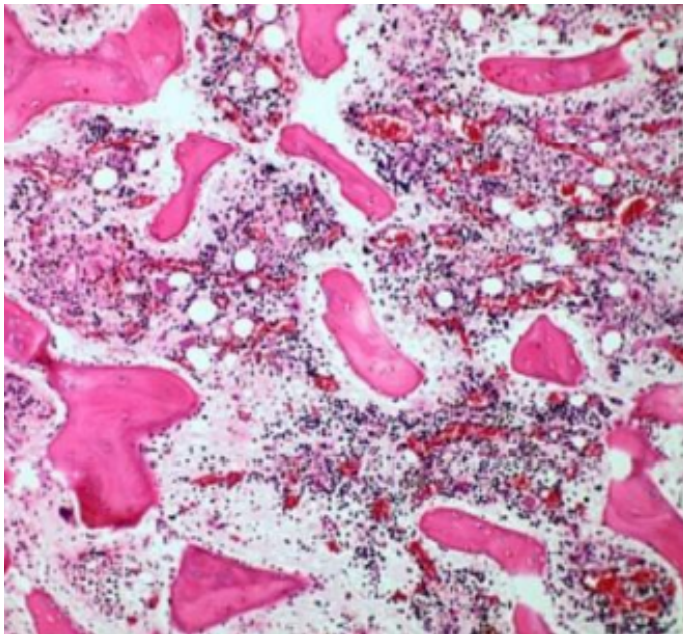
IIT Mandi turning farmers of Kamand valley into Farmer Producer Companies with NABARD.

Kamand valley Society, Mandi and IIT Mandi have been organizing farmers in the surrounding areas into farmer producer companies (FPC) supported by NABARD (Agreement signed in Feb 2020). To increase productivity in a scientific way, they are working with the model Local community - NGO (EWOK) - Academia (IIT Mandi, CSIR-IHBT), - Industry (Nature Biotech Products).
EWOK keeps organizing interactive sessions to bring all the stakeholders in this model together to address the issues faced by farmers of Mandi district regarding the cultivation of targets, the last session was held on 7th June 2022. They have been distributing seeds to the local farmers, a total of 60 farmers have received the seeds this year. EWOK keeps organizing interactive sessions to bring all the stakeholders in this model together to address the issues faced by farmers of Mandi district regarding the cultivation of targets, the last session was held on 7th June 2022. They have been distributing seeds to the local farmers, a total of 60 farmers have received the seeds this year.

AMPRI-Bhopal Researchers Develop Immunosensor For Detection of Early Breast Cancer.

Breast cancer today is one of the leading causes of cancer death in women across the world with an estimated 2.2 million breast cancer cases being diagnosed globally in 2020 alone. There are numerous invasive and noninvasive ways for early detection of breast cancer. To overcome these issues, researchers from CSIR-Advanced Materials and Process Research Institute (AMPRI) Bhopal have developed a highly sensitive electrochemical immunosensor for the detection of breast cancer biomarker CD44 antigen.

To further improve its properties, nano composite gold nanoparticles were also combined. The resultant GO-IL-AuNPs hybrid nanocomposites were also previously used by several researchers to develop an electrochemical sensor for the detection of dopamine in urine and a voltammetric biosensor for the detection of 2,4-dichlorophenol up to nanomolar concentration. Researchers synthesised an electrochemical immunosensor constructed using GO-IL-AuNPs on a glassy carbon electrode to detect CD44 antigen. They made use of various methods to validate the structural and functional capabilities of the synthesised nanomaterials using UV -- visible spectroscopy, FTIR spectroscopy, Raman spectroscopy, X-ray diffraction (XRD), field-emission scanning electron microscopy and transmission electron microscopy.



Gujarat: India's First Road Constructed From Steel Slag Inaugurated In Surat.

Steel Minister inaugurated the first six-lane highway road made by using steel slag at Surat, Gujrat. While inaugurating the road, the Minister impressed upon the need to promote the circular economy and resource efficiency by converting all waste into wealth," the Ministry of Steel said in a statement. Slag is a by-product of steel manufacturing. The use of such material in road construction shall not only increase its durability but also help in reducing the cost of construction as slag-based materials have better properties than natural aggregates, Singh said.

The road has been jointly made with the Central Road Research Institute (CRRI) -- a laboratory of the Council of Scientific and Industrial Research (CSIR), ArcelorMittal Nippon Steel Minister Ram Chandra Prasad Singh on Wednesday, June 16, inaugurated a six-lane highway in Gujarat's Surat, made of steel slag -- a first for the country. The road constructed using 100 per cent steel-processed slag is a real example of converting "waste into wealth" and improving the sustainability of steel plants, the minister said. Steel (AMNS) India said in a statement. AMNS India CEO Dilip Oommen said, "Supported by the CRRI, we are proud to have developed an alternative to natural aggregates in road construction, which is of international standards, cost-competitive and reduces the burden on natural resources.

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

MoST Jitendra Singh says, success of 'Purple Revolution' has shifted focus to agri-tech start-ups.

Purple Revolution was launched to empower domestic farmers and support India's aromatic crop-based agroeconomy by reducing imports of aromatic oils and increasing homegrown varieties. While interacting with the media, Singh said that due to high monetary returns, farmers in hilly areas of Jammu and Kashmir are switching from traditional farming to aroma crops like lavender in a big way. The Minister informed that CSIR is also planning to introduce the aroma crops in other hilly States with similar climatic conditions like Uttarakhand, Himachal Pradesh and in the NorthEastern States. Dr Jitendra Singh said, "Centre's Aroma Mission, ably supported by CSIR, is changing the mindset of farmers and more and more of them are taking up the cultivation of aroma crops like lavender, lemon grass, rose and marigold for extracting costly oils to be used in many industries.

MoU Signed With CSIR-CIMAP For Pilot Mission On Medicinal, Aromatic Plants In Assam.

A Memorandum of Understanding (MoU) signed between the Directorate of Horticulture and Food Processing, Government of Assam, and the Council of Scientific and Industrial Research (CSIR)- Central Institute of Medicinal and Aromatic Plants (CIMAP) was formally exchanged on Tuesday, 21, for providing Technical Advisory support for the Pilot Mission on Medicinal and Aromatic Plants (MAP) in Assam. The pilot mission is for two years under the World Bank Financed Project – Assam Agribusiness and Rural Transformation Project (APART). This Pilot Mission is for the first time in the State under APART and has been initiated with the cultivation of few crops like lemongrass, vetiver, tulsi and patchouli in selected districts, namely Dhemaji, Majuli, Biswanath, Karbi Anglong, Goalpara, Kokrajhar and Dhubri.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR Technologies for Rural Livelihood Technology Demonstration and Networking Meet

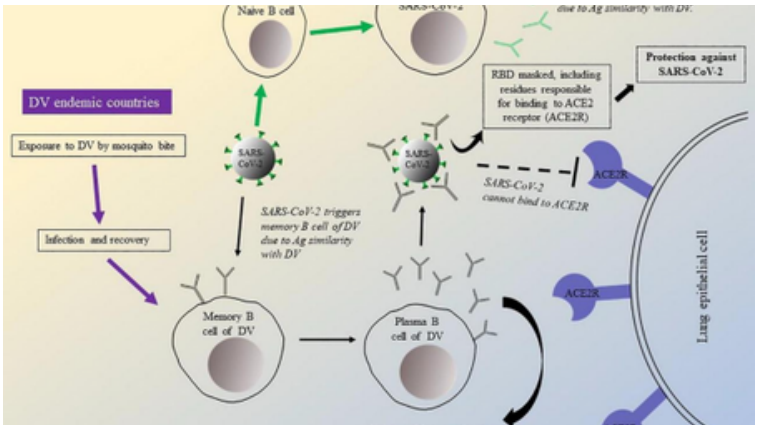
CSIR-National Institute of Science Communication & Policy Research (CSIR[1]NIScPR), Unnat Bharat Abhiyan (UBA) and Vijnana Bharati (VIBHA) have jointly undertaken a major initiative for the dissemination of CSIR technologies to create livelihood opportunities in rural areas. In this context, CSIR-NIScPR, CSIR-IHBT, UBA and VIBHA jointly organized a tow-days 'Technology Demonstration and Networking Meet' on 29-30 June 2022 at CSIR-IHBT, Palampur. The key objective of this Meet was to showcase and demonstrate rural technologies developed by CSIR-IHBT that can help in farmers' livelihood creation and enhance their income through the development of business opportunities. The meet brought scientists, researchers, investigators, Regional Coordinating Institutes (RCIs) and Participating Institutions (PIs) of UBA, SHGs, FPOs, and village communities together on a single platform to discuss opportunities as well as challenges in the successful translation of the identified technologies.

Road to sustainability- Zero emission of CO2 in aviation

While the global airline industry has targeted 2050 to achieve net zero carbon emissions, India is banking on sustainable fuel-powered airlines and increased use of advanced aviation technology and digitisation to prepare for a net zero carbon-future by 2070. Civil Aviation Minister Jyotiraditya Scindia recently said the country will have 96 carbon-neutral airports running on renewable energy by 2024.

India's National Policy on Biofuels has underlined the need to support the use of feedstocks that do not conflict with food supply and ensuring that the land use concerns are accounted for to produce SAF. IndiGo had last December entered into an agreement with CSIR-Indian Institute of Petroleum (CSIR-IIP) to become partners in leading the deployment of sustainable aviation fuel in India and globally. SpiceJet, in a partnership with Boeing, has also signed an agreement with the CSIR-IIP to source sustainable fuel from them and its production partners in order to decarbonise its respective fleets. In a statement, CSIR-IIP Director Anjan Ray has said: "CSIR-IIP is committed to achieving India's goal of net-zero greenhouse gas emissions and indigenous, globally competitive, sustainable fuel production for a wide range of transportation and industrial uses. We believe that the synergies ... can enhance national self-reliance as well as strengthen India's position in the global aviation sector.

Covid less severe in dengue zones, says study - IICB, Kolkata



Ongoing research by an Indian Institute of Chemical Biology (IICB) scientist in Kolkata has indicated that the severity of Covid has been less in dengue-prone areas. In April 2020, CSIR-Indian Institute of Chemical Biology (IICB) virologist Subhajit Biswas coined the term, "Dengue Covid Conundrum" talking about how Covid-19 severity and mortality were observably less in highly dengue-endemic countries, including India. Study has led to increasingly conclusive evidence that an inverse relationship exists between the two viruses. In July 2020, Biswas conducted the first lab study and the findings confirmed his observation. It showed that pre-pandemic dengue samples produced false positive results in Covid antibody tests.

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Innovations and Contributions by CSIR labs

In this issue:

An agreement for joint commercialization of Earthquake Warning System was signed by CSIR-CSIO, Chandigarh & Engineers India Limited (EIL), New Delhi

CSIR-CSIO, Chandigarh & Engineers India Limited (EIL), New Delhi inked an agreement for joint commercialization of Earthquake Warning System CSIR-CSIO engaged Engineers India Limited (a Navratna PSE under Ministry of Petroleum and Natural Gas) as the technology commercialization partner for next five years on 30.06.2022. The MoA cum Transfer of Technology (ToT) Agreement was signed on 30th June 2022 in the presence of Prof. S. Anantha Ramakrishna, Director, CSIR-CSIO and Ms. Vartika Shukla, C&MD, EIL.

Under this agreement, CSIR-CSIO and EIL will jointly commercialize the technology of "Earthquake Warning System". This agreement will not only help save lives in future but also help both the organizations to increase the scope of application areas e.g. critical infrastructures/installations where this technology can be put to use.

CSIR IIIM in pursuit of conserving endangered medicinal plants.

Kashmir Himalayas are home to various species of high value medicinal plants with more than 600 species finding its use in traditional system of medicine in one form or the other. These plants include Sassurea costus (Kuth or Putchuk), Picrorhiza kurroa, (Kutki), Artemisia species (Mugwort, woodworm), Pyrethrum (Chrysanthemum), Hypericum perforatum (St. John's wort), Trillium govanianum (Nag Chhatri) etc.

For eg. Artemisia herba-alba, a specie of Artemisia, is used for cough, stomach &intestinal problems, common cold, measles, diabetes, jaundice, anxiety, irregular heartbeat, and muscle weakness. It is also used as insect repellent. Similarly, costus oil obtained from roots of Saussurea costus is used in leprosy. Saussurea costus roots is also used in traditional medicines to treat medical conditions including chronic gastritis, stomach ulcers, rheumatoid arthritis, asthma and bronchitis. Picrorhiza is used for treatment of liver and upper respiratory tract issues. It is also used to reduce fevers, and to treat dyspepsia and chronic diarrhea. Podophyllum hexandrum is used in drug for prostate cancer.

Thus, CSIR IIIM are initiating to bring available rare plant species from different ecological niches of Kashmir Himalayas and consolidating them. In addition they are also bringing new plants that are listed in IUCN Red Book as endangered and are on the verge of extinction. CSIR-IIIM have a plan to work closely with the Jammu and Kashmir Forest Department for a joint programme on conservation for endangered plant species of Kashmir. They are contemplating to develop a Himalayan Biodiversity Park.

Night compost soil in Himachal Pradesh's Lahaul highly nutritive, finds study.

The night soil compost, produced commonly in homes around Lahaul in Himachal Pradesh, can best be used as soil conditioner and results in higher germination rates of both food and non-food crops, a new study has found. Funded by the National Mission on Himalayan Studies, the study conducted by researchers from CSIR – Institute of Himalayan Bioresource Technology (IHBT), Palampur, was aimed at evaluating the quality of the night soil compost, its safety and microbiome quality. Night soil compost is formed after human faeces is converted into a compost-like soil amendment in a dry toilet system that is traditionally used in several Himalayan regions.

All set for study of genetic relations of Harappan population with other regional culture populations.

Sufficient archaeological evidence is observed that people of the Harappan civilisation have dispersed over hundreds of years across the country towards Rajasthan, Bengal, Maharashtra, Tamil Nadu and other places. There has been no genetic study of their mixing with the people of other regional cultures, which came up later," according to archaeologist scientist Dr. Vasant Shinde, Bhatnagar Fellow.

CSIR-CCMB is going to take up a study for genetic mutations that have occurred over centuries among the two populations and trace the lineage. Samples of the ancient DNA and modern-day samples collection will help in carrying out comparative analysis to understand the population composition. The study will be shared publically and a likely debate could be possible on the established notions about population migrations and genetic mixing when questioned. CCMB has the facilities for extracting, analysing and sequencing the ancient DNA from skeletal remains of ancient Indians. The infrastructure will need improvment for a new "Class 10,000" facility for better extraction and analysis. This 'follow up' research will help CCMB to get into the next stage of ground-breaking study on skeletal remains found at the Harappan site of Rakhigarhi village in Haryana under his tutelage. An ancient DNA was extracted from the remains of a young woman's skeleton from about 60 skeletal samples which were collected from a well-preserved cemetery in Rakhigarhi (considered to be the biggest Harappan city).

Researchers successfully sequenced the first genome from this sample, combined it with archaeological data, which showed that these people had distinct genetic roots that originated independently.

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Innovations and Contributions by CSIR labs

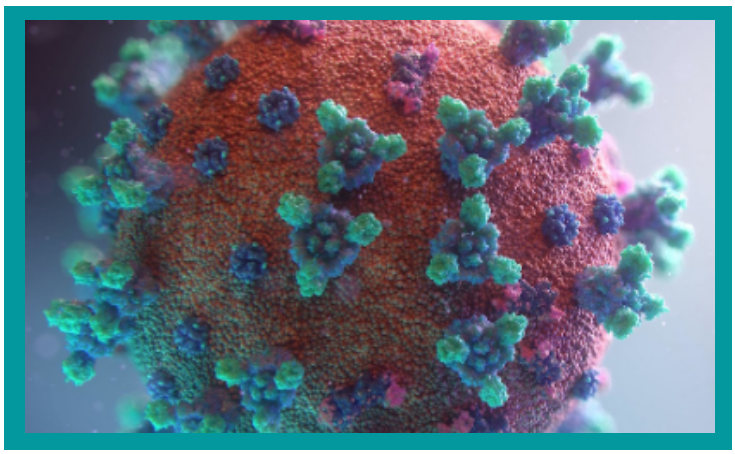
In this issue:

India Successfully Cultivates Anti-Malarial Plant ‘Artemisia'

The artemisia plant, which is used to develop artemisinin (drug) and its derivatives for treating acute malaria and parasitic worm (helminth) infections, is now been cultivated in India, Earlier the country was heavily reliant on China, which is the largest and natural grower of artemisia . "Because the artemisia plant is primarily found in China, it is used to prepare artemisinin and export it to other countries. " India was also reliant on China, but extensive research by the CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) resulted in the development of a new species with a high artemisinin concentration of 1.2 percent. The chemical extracted from the plant, which comes in over 200 varieties, is used to make artemisinin, which is then used to make drugs for meningitis treatment. In a recent technology transfer programme, Prabodh Kumar Trivedi, director of CSIR-CIMAP, stated, "This plant is proving to be life-saving for meningitis patients. “
CIM-Sanjeevani is the result of extensive breeding work over the last 12 years. According to the Journal, it was created through poly cross progenesis between two existing varieties, Jeevan Raksha and CIM Arogya.

IISc develops new mechanism to inactivate SARS-CoV-2

Scientists at the Indian Institute of Science (IISc), Bengaluru in collaboration with researchers from the CSIR-Institute of Microbial Technology, have reported the design of a new class of synthetic peptides that can not only block the entry of SARS-CoV-2 virus entry into cells but also clump the virions (virus particles) together, reducing their ability to infect. This binding was further characterised extensively by cryo-electron microscopy (cryo-EM) and other biophysical methods. The research was supported under the COVID-19 IRPHA call of SERB Science and Engineering Research Board (SERB), a statutory body of the Department of Science and Technology (DST). The team tested the peptide for toxicity in mammalian cells in the lab and found it to be safe. When hamsters were dosed with the peptide and subsequently exposed to a high dose of SARS-CoV-2, they showed decreased viral load as well as much less cell damage in the lungs compared to hamsters exposed only to the virus, demonstrating the promise of this class of peptides as antivirals.



2-day workshop on advanced technologies, plastic waste use in road construction begins in Kargil.

Rural Development and Panchayat Raj Department (RD&PRD) UT Ladakh in collaboration with CSIR-CRRI today started a training program on Customized Capacity Building on advance technologies, use of waste plastic in road construction and road safety measures in Ladakh. The workshop was inaugurated today at Auditorium Hall Kargil in presence of Executive Councilor for RD&PRD in LAHDC Kargil Er Phunsok Tashi. At the inaugural ceremony of the two-day workshop, EC Tashi said the workshop is aimed to adopt and learn modern technologies in the management of plastic for construction works. He expressed optimism that after the workshop, the engineers from Kargil will get a better idea of usage and implementation of technology in making sustainable and eco-friendly roads.

Artificial Intelligence to help TSRTC (Telangana) buses avoid accidents.

A multi-stakeholder project with predictive power of Artificial Intelligence (AI) at its core to curb road accidents involving Telangana State Road Transport Corporation (TSRTC) fleet is all set to gain momentum. It will be extended to 200 buses following satisfactory first phase that covered 14 buses, a senior official of TSRTC told the formal launch of project iRASTE by Industries and IT Minister K.T. Rama Rao, at the IIIT-Hyderabad on Tuesday 12th July 2022.

The outcome will be of significance considering the lives saved. TSRTC Executive Director (Engineering) C. Vinod Kumar said the Corporation's spend by way of annual compensation to accident victims is ₹ 50 crore.

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In this issue:

Roads in Ladakh to be made out of plastic.

703km of National Highways

The Ladakh administration has decided to build roads with growing plastic waste to preserve ecology and reduce the carbon footprint in the Himalayan region. The official order passed regarding this initiative was taken by the Administrative Secretary of the PWD Department of Ladakh. It states that it is mandatory to make use of at least 10% of plastic waste for road construction in Ladakh. The goal is to dispose of the tons of plastic waste left behind by tourists over the years. Roads built using plastic also tend to last longer and have better durability as compared to traditional asphalt concrete roads, cutting down the cost of maintenance. They also have the ability to withstand water and have a smoother surface.
Until now, the country has almost 33,700 km of plastic roadways, which means that almost every kilometer of road uses at least 1 million plastic bags. However, as of 2021, only 703 kilometers of National Highways were constructed using plastic roads.

'Use Of Latest Technology, Nano-Fertilisers Key For Boosting Agri Production.

Maintaining that using nano-fertilizers and cutting-edge technologies is essential for increasing agricultural yield, The depletion of nutrient-dense food supply worries Prof. S. Ayyappan, Chancellor of Central Agricultural University, Imphal and Chairman of the Karnataka Science and Technology Academy. He was speaking as the chief guest at the Azadi Ka Amrit Mahotsav seminar on 'Innovation to build resilient, sustainable food supply for nutritional security' organised by the Association of Food Scientists and Technologists – India (AFST-I) as part of 29th ICFoST at CSIR-CFTRI campus here.

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SCIENCE AND SOCIETY NEWSLETTER

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In this issue:

MOU signed by GOI for R and D on traditional system of medicines.

The Government of India has signed 25 Memorandum of Understandings (MoUs) for country to country cooperation in the field of medicine Nepal, Bangladesh, Hungary, Trinidad & Tobago, Malaysia, Mauritius, Mongolia, Turkmenistan, Myanmar, World Health Organization, Germany, Iran, Sao Tome & Príncipe, Equatorial Guinea, Cuba, Colombia, Japan, Bolivia, Gambia, Republic of Guinea, China, St Vincent and The Grenadines, Suriname, Brazil and Zimbabwe. 37 MoUs for undertaking collaborative research and development of Traditional Medicine has been signed with foreign Institutes/Universities/Organizations from USA, Germany, UK, Canada, Malaysia, Brazil, Australia, Austria, Tajikistan, Saudi Arabia, Ecuador, Japan, Indonesia, Reunion Island, Korea and Hungary etc.. 15 MoUs have been signed for setting up of Ayush Academic Chairs in foreign Institutes/Universities from Hungary, Latvia, Mauritius, Bangladesh, Russia, West-Indies, Thailand, Indonesia, Slovenia, Armenia, Argentina, Malaysia, South Africa, Australia and Mexico. The constituent laboratory of Council of Scientific & Industrial Research namely Institute of Himalayan Bio-resource Technology (CSIR-IHBT), Palampur has signed an MoU with National Research Institute of Chinese Medicine, Ministry of Health and Welfare, Taiwan, to collaborate in the areas of mutual interest which included medicinal plants, bioactive molecules, herbal formulations etc.

CSIR-IICT designs unique Effluent Treatment Plant- Scientists come up with plant for U.K. Aromatics Pvt. Ltd. in Maharashtra.

A team of scientists from CSIR-Indian Institute of Chemical Technology (CSIR-IICT) have designed a unique Effluent Treatment Plant (ETP) for industrial aroma chemicals, based on a high rejection hyperfiltration membrane technology, it was announced on Friday. Chief scientist S. Sridhar and principal investigator-senior scientist S. Chandra Sekhar from the Membrane Separations Laboratory designed the plant for the U.K. Aromatics Pvt. Ltd., Boisar, Maharashtra. The effluent is a condensate coming from a multiple-effect evaporator (MEE) containing considerable content of total dissolved solids (TDS), turbidity, and colour besides high chemical oxygen demand (COD) levels due to the presence of significant concentrations of aroma chemicals such as esters, flavours, and perfumes with smaller concentrations of toluene and cyclohexane solvents used in azeotropic distillation for isolation of the esters. The membrane is specifically developed at CSIR-IICT from 'hydrophilised polyamide' which is more hydrophilic or dissolves in water, chemically inert, with a thicker selective skin layer as compared to commercial membranes.

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UNA district administration ropes in CSIR to combat malnutrition

To combat malnutrition, the Una district administration will launch an initiative to provide highly nutritious packaged food at Anganwari centres for children and expecting and lactating mothers. The administration has roped in the CSIR-Institute of Himalayan Bioresource Technology (IHBT), Palampur, which has developed packaged food products that have high nutritional content, for the initiative. Deputy Commissioner (DC) Raghav Sharma said the IHBT had come up with products such as spirulina bar, multi-grain energy bar, multi-grain high energy powder and fruit bar. Spirulina, which is an algae, is used to develop a super-food that has high content of essential minerals and vitamins.

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Namami Gange Programme (NGP) : Rejuvenation Of River Ganga & Its Tributaries.

The Namami Gange Programme (NGP) is dynamic and evolving in nature to address the emerging needs and priorities for rejuvenation of river Ganga & its tributaries. Under NGP, State level annual action plans are prepared and projects are developed by the States and taken up for implementation after due approval process and efforts are made to complete the projects by their scheduled timelines. Under NGP, State level annual action plans are prepared and based on that it was targeted that 127 sewerage and Ghat/crematoria projects were to be completed from 2019-20 to 2022- 23. Out of the targeted 127 projects 80 projects have been completed till date. During last three years, 122 projects have been completed resulting in creation / rehabilitation of 1068 MLD STP capacity, laying of 1580 km of sewerage network, development/rehabilitation of 82 ghats & 20 crematoria, river front development at Patna, eflow notification etc.

New technology that deactivates COVID-19 virus in just 1 minute validated by CSIR IMTECH

A startup incubated at the Startup Incubation and Innovation Centre (SIIC), IIT Kanpur – AiRTH has developed a technology "Anti Microbial Air Purification Technology", which can deactivate SARS-CoV-2 virus with an efficiency of 99.9% within just 1 minute. The technology validated to be able to deactivate SARS-CoV-2 virus after being tested at CSIR-IMTECH has been developed jointly at IIT Kanpur and IIT Bombay. This proven path-breaking innovation against both air pollutants and the corona virus is named "Anti-Microbial Air Purification Technology". Not only does it purify the air but it also helps to destroy germs, as well, thus ensuring complete protection. According to an official statement issued by IIT Kanpur, research from leading universities of the world found air pollution combined with COVID-19 is far more severe and dangerous.

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SCIENCE AND SOCIETY NEWSLETTER

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In this issue:

Kerala's first two monkeypox cases not linked to Europe outbreak.

The genome sequencing of the first two cases from Kerala suggests they belong to the A.2 cluster which has been reported in the US, Thailand and now in Kerala. With confirmed monkeypox cases in India rising to eight including one death from Kerala, scientists and researchers are trying to understand more about the spread of the disease. Genome sequencing of the first two cases from Kerala suggests that they are not linked to the monkeypox outbreak in Europe. The first two monkeypox cases in Kerala had a travel history to the Gulf. In an email interview to TNM, Dr Vinod Scaria, a senior scientist at the Delhi-based Institute of Genomics and Integrative Biology (CSIR-IGIB), said, "The two genomes from Kerala suggest that they belong to a distinctly different lineage (A.2) compared to the B.1 lineage linked to the European superspreader events and outbreak of monkeypox in 2022. " The genome sequencing was performed by the National Institute of Virology (NIV), Pune, and deposited in the GISAID, a global database.

Under Aroma Mission 2,000 farmer clusters formed by CSIR-CIMAP.

About 2,000 farmer clusters have been formed under the Aroma Mission run by CSIRCentral Institute of Medicinal and Aromatic Plants (CIMAP) and associated laboratories. The farmers of these clusters have been extensively linked with the cultivation of aromatic crops, as a result of which, today, India is moving towards exporting, and becoming self-sufficient in the production of oil of lemongrass and palmarosa," said Prabodh Kumar Trivedi, director, CIMAP. "This training will help farmers get more yield, and the raw material can be made available to the industries. In view of the world-demand, there is a need to promote the cultivation of aromatic plants," he said. "For the next two days, CIMAP scientists will discuss in detail the cultivation of economically important medicinal and aromatic plants, as well as processing and storage techniques, so that farmers' production can be of international quality and farmers can receive a good price. These medicinal and aromatic crops include lemongrass, palmarosa, geranium, basil, and others. Their oils are currently in high demand on the global market," the director said

Researchers identify fungus for pyrene remediation.

Researchers at the Council of Scientific & Industrial Research-Indian Institute of Petroleum (CSIR-IIP), Dehradun, have identified a fungus capable of removing toxic, recalcitrant, and carcinogenic polycyclic aromatic hydrocarbons (PAHs) from the environment. The rapid pace of economic development and industrialization has resulted in the release of several PAHs into the environment. The PAHs are ubiquitous environmental pollutants originating from multiple sources, including combustion of petrogenic fossil fuels, and incomplete incineration of municipal wastes and biomass. Pyrene, possessing four benzene rings, belongs to the highly toxic class of PAHs, with carcinogenic and mutagenic properties. It gets lodged into the environmental matrices like soil, water and atmosphere, resulting in widespread environmental pollution, necessitating adequate remediation of contaminated environmental matrices.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Breaking barriers: Nallathamby Kalaiselvi - the first woman to head CSIR.

The first woman to head the Council for Scientific and Industrial Research (CSIR), Dr Nallathamby Kalaiselvi, is credited with developing novel materials to be used as electrodes in lithium-ion batteries that improve their storage capacities.
While most attention on her is focused on the fact that she is the first woman to head the
Council for Scientific and Industrial Research (CSIR), the largest network of research laboratories in the country, Dr Nallathamby Kalaiselvi"s core expertise is very much in sync with some of the most pressing national scientific priorities. she joined CECRI. She was an organic chemist and had taught the subject for about three years at a private college after completing her PhD from Annamalai University in Chidambaram.

RIL leveraged its IP, R&D capabilities to fight Covid.

Reliance, a responsible organisation, leveraged its intellectual capital to contribute to the countrys fight against Covid-19. Reliance's scientists analysed more than 1,000 genomes of the virus. The knowledge base was used to develop novel cost-effective diagnostic kits called 'R-Green' and 'R-Green pro one'. These kits have received ICMR approval and showed a high degree of accuracy and specificity during validation studies. Reliance has also collaborated with CSIR-IIIM (Jammu) to develop an RT-LAMP Kit to facilitate the point-of-care diagnosis of Covid-19. The R&D team actively contributes to the company's technical wisdom to facilitate innovation globally by publishing research articles on diagnostics and treatment. Application of natural astaxanthin for COVID-19 management published in „Biomedicine and Pharmacotherapy' journal is recognised as top 100 research paper. The paper is listed in WHO's global repository.

Indian Coast Guard conducts marine pollution response seminar cum workshop.

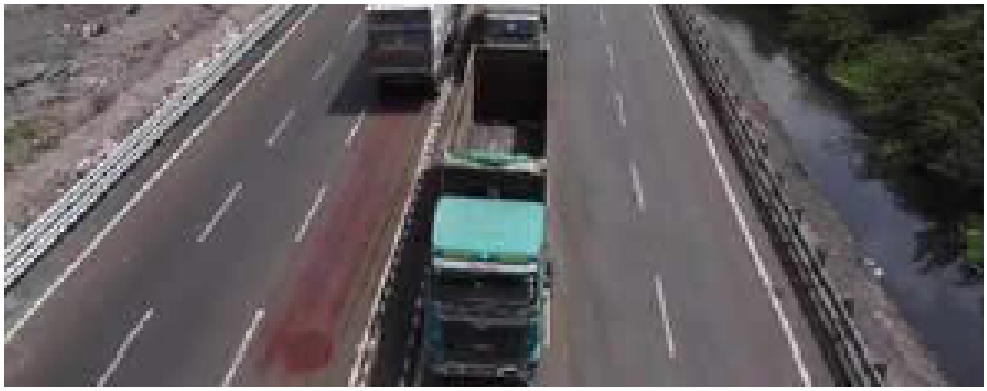
Indian Coast Guard on Wednesday started its two-day seminar cum workshop on marine pollution response in No. 4 Coast Guard District Headquarters (Kerala and Mahe) with an aim of increasing knowledge and cohesiveness among government and nongovernment organizations such as port authorities, oil companies, fisheries, and other agencies on the subject. As per a press release from the Indian Coast Guard, the rationale of the seminar is to build and launch coordinated efforts for protecting the shores during any unforeseen situation of oil spillage at sea or within port limits. The seminar was inaugurated by DIG N Ravi, Commander Coast Guard Headquarters (Kerala and Mahe)

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

BRO to build first steel slag road on border



In a first, the Border Road Organization (BRO) will take up the construction of a pilot road stretch in Arunachal Pradesh using steel slag, which can withstand heavy rains and adverse climatic conditions. If it's found successful, this can become a big solution for building durable roads along the strategic areas. The project has been initiated after the success of using 100% steel slag on a port connectivity road in Gujarat, which has longer life and built at low cost. This 1.2 km Hazira port connectivity stretch was a research and development (R&D) project carried out by CSIRCRRI in collaboration with a major steel manufacturer and steel ministry. The project was developed with the aim to "convert waste to wealth" and around one lakh tonne of processed steel slag aggregates have been utilized here substituting the natural aggregates, said director of CSIR-CRRI, Dr Ranjana Aggarwal.

1st Ladakh AgriTech Mela begins in Leh.

The first Ladakh AgriTech Mela began with an inaugural function organised by STI HUB Ladakh in collaboration with LAHDC Leh, CSIR-IMTECH Chandigarh and NIELIT Leh. Lt. Governor, Ladakh, RK Mathur attended the inaugural function as the chief guest whereas the guests of honours were Dy Chairman, LAHDC Leh, Tsering Angchuk; EC Agriculture, Stanzin Chosphel; EC RDD Tashi Namgyal Yakzee; Principal Secretary Heath, Dr. Pawan Kotwal; Commissioner Secretary Skill Development, Padma Angmo; Secretary Agriculture, Ravinder Kumar; DC Leh Shrikant Suse and Director CSIR-IMTECH Chandigarh, Sanjeev Ghosla. Earlier, the officials inaugurated Science, Technology, and Innovation (STI) HUB at the office of NIELIT Leh. The STI Hub is a collaborative project by CSIR-IMTECH Chandigarh, PGIMER Chandigarh and NIELIT Leh to facilitate economic development by supporting and nurturing young innovators to establish small, medium – business enterprises.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Union minister applauds startup founders at CSIR's bldg inauguration

From carrying out under-the-radar border surveillance, to improving internet access to remote corners of the country, the Council of Scientific and Industrial Research-National Aerospace Laboratories' (CSIR-NAL's) futuristic solar-powered unmanned aerial vehicle (UAV) could soon make India one of the few elite nations to have its own High Altitude Platforms (HAP).
At the Wings India 2022 civil aviation event held last month in Hyderabad, NAL demonstrated a functional, sub-scale model of the HAP – an unmanned flying vehicle that runs on solar power during the day and high-density lithium ion batteries at night.
The lightweight UAV is capable of flying at heights of over 22 kilometres, for up to 90 days, with payloads of over 16 to 20 kilograms. Speaking to ThePrint, Jitendra Jadhav, Director of NAL, explained that the HAP will work as a pseudo satellite for telecommunication applications in the 5G & 6G spectrum.

Indian scientists have developed a portable disinfection device based on electrostatic technology.

Scientists from the Central Scientific Instruments Organization (CSIR-CSIO), a Chandigarh-based constituent laboratory of the Council of Scientific and Industrial Research (CSIR), have developed a new portable disinfection device. The device effectively prevents the spread of pathogenic microorganisms, including the coronavirus, say the researchers. It is a handheld device based on electrostatic technology, which works on two fronts. First, when spraying disinfectant liquids, the device emits electrically charged droplets capable of killing viruses in the air. Secondly, charged droplets from the device can reach hidden areas of any target that may contain viruses.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

1st Made-in-India Hydrogen Fuel Cell Bus Unveiled in Pune.

Union Minister of State for Science and Technology Dr Jitendra Singh launched India's first truly advanced hydrogen fuel cell bus. Developed by KPIT-CSIR in Pune, the fuel cell bus uses hydrogen and air to generate electricity, and the only effluent from the bus is water. For comparison, a diesel bus plying long-distance routes typically emits 100 tons of CO_2 per year, and India has over a million such buses. Additionally, the high efficiency of fuel cell vehicles and the high energy density of hydrogen ensure that fuel cell trucks and buses have lower operating costs per kilometer than diesel powered vehicles. Dr Jitendra Singh points out that around 12-14% of CO_2 and particulate emissions come from diesel-powered heavy-duty vehicles, which are decentralized emissions and therefore difficult to capture.

Over 100 farmers participated in CSIR-IIIM sponsored workshop in JK's Bhaderwa

Bhaderwah (J-K), Aug 23 (PTI) Over 100 farmers associated with cultivation of commercial flowers on Tuesday participated in a workshop organised by Council of Scientific and Industrial Research (CSIR) and Indian Institute of Integrative Medicine (IIIM) here in Doda district of Jammu and Kashmir, officials said. The interactive workshop on 'challenges, interventions and opportunities' for the farmers under CSIR Floriculture Mission was primarily aimed at informing the farmers about the capacity building, value addition and post-harvest management of high-value floricultural crops, they said. "Bhaderwah has immense potential in floriculture, especially cut flowers and aromatic plants and owing to the high demand of cut and loose flowers, the mission with its various strategically devised verticals offers a unique opportunity in enhancing the economy of the Union Territory, especially areas like Bhaderwah," nodal scientist of CSIR floriculture mission Shahid Rasool said.

What is Purple Revolution?

India is proceeding with the formalities of obtaining what is called the "ASTM D4054" certification to be able to mix indigenous aviation biofuels with Aviation Turbine Fuel (ATF) for commercial aviation. The certification is for establishing that the aviation biofuel itself, as well as the process of manufacturing it, both conform to ASTM D4054 standards. These standards have been set up by ASTM International (formerly, American Society for Testing and Materials), founded in 1898. The CSIR-IIP is the technology provider and thus it is the responsibility of the CSIR-IIP to secure the certification.

By the time the certification happens, a consortium of a public sector refiner in south India, Indian Institute of Petroleum and Engineers India Ltd would have already finalized a project to put up a demonstration plant capable of producing about 15,000 liters per day of sustainable aviation fuels (SAF) based on bio-derived sources.

Presented by:

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR's floriculture mission a boon for Maharashtra flower cultivators

The farmer clusters cultivating flowers under the nationwide "CSIR Floriculture Mission" are reaping benefits through the training provided by CSIR-National Botanical Research Institute (NBRI) of Lucknow. The farmer clusters in Vidarbha region of Maharashtra are overjoyed with the marigold flowers blossoming in their farms. More than 192 farmers of 8 clusters in Vidarbha region alone were provided the marigold saplings in the month of June and July in 2022. After 2 months, the result has brought smiles on the faces of these farmers who had no work. The women farmers informed NBRI's Maharashtra coordinators Dr Vijay Wagh and Dr Manish Bhoyar. Not only are they seeing positive results, but they are also able to sell their produce at the nearby market with increasing demand for flowers due to Ganesh Chaturthi and the recently concluded Maharashtra Pola festival.

Marginal farmers of Uttar Pradesh, Madhya Pradesh, West Bengal, Odisha, Maharashtra and Bihar have also been included in the mission. India stands on the 18th rank in the floriculture industry with only 0.61% global floriculture share. It imports flowers worth ₹38.25 cr from Thailand, Netherland and other countries, according to NBRI officials. More farmers and lands were brought under the mission to meet the huge market of flowers in India. "The objective of the mission is to enhance the income of farmers and entrepreneurship development through high value floriculture utilizing CSIR technologies," said Prof SK Barik, Director of CSIR-NBRI, Lucknow who is also mission director of CSIR Floriculture Mission.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR set to launch technology to check milk spoilage before purchase

CSIR will soon unveil a technology to help consumers check the freshness of milk without opening the packet. Tentatively called 'Time Temperature based Spoilage Indicator Testing'. The cost of each technology packet will be 20-25 paisa. This initiative may help to implement the technology at mass scale. Speaking at the ongoing IDF World Dairy Summit 2022, Rajeshwar S. Matche, Chief Scientist and Head, Food Packaging and Technology, CSIR-CFTRI said that ordinary people face this basic issue of buying a packet of milk but cannot identify if it is spoilt at the outlet itself. A significant issue for the organized dairy industry as well, CFTRI division of CSIR started working on this specific issue based on market feedback and has so far tested this label based easy to use technology on milk, meat and idli & dosa batter. The team has been closely working with Nandini Dairy for experiments with near to 100% success rate.

Water-related innovations can facilitate sustainable consumption

Experts deliberated on innovations for producing potable drinking water, including application of technologies like desalination and Heli-borne methods, at the Center-State Science Conclave on September 11, 2022.
"Effective and pragmatic approach to map water availability, allocation and usage through technological interventions and concerted approach involving all stakeholders, including academia and industry can help reducing consumption and sustainable usage of water," said Director General CSIR Dr N Kalaiselvi.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

How is the Lumpy skin disease spread in 2022 different from 2019 ?

Concerns have been raised about whether the new vaccine being developed to protect cattle will provide adequate protection in light of the lumpy skin disease (LSD) virus's potential structural difference from the version of the virus prevalent in India in 2019. LSD has killed at least 50,000 cattle in India this year, and the virus may have changed from that version in 2019. Researchers from the State Disease Diagnostic Centre in Jaipur and the Council of Scientific and Industrial Research-Institute of Genomics and Integrative Biology (CSIR-IGIB) examined and compared the virus genomes of five sick animals. When genetic sequences from previous outbreaks of the disease were compared to those from six genomes (many genomes from a single animal), it was discovered that the organism had "little similarity to global genomes. " Four genome sequences from the 2019 outbreak of the disease that were deposited in GenBank, did not contain any of the 177 unique mutations discovered by the genome study.

Variation in fish sound linked to temperature change in water: NIO study

While the impact of temperature change on land is easily ascertained by various indicators like behavioural pattern of living beings, very little is known about the same when it comes to the situation underwater. Now, a study by National Institute of Oceanography (NIO) Goa, has found that variation in fish sound is directly linked to temperature change happening underwater. The team of scientists at NIO led by CSIR-Emeritus Scientist The underwater sound intensity and dominant frequency caused by fish calls fluctuates as water temperatures change, and the pulse repetition rate decreased when the water temperature increases conducted study of passive sound waves generated by marine species underwater in three shallow water sites in Goa - Off Britona in Mandovi estuary, In Grande Island in Zuari estuary, off Mormugao Port and Sal River off Betul. The findings have been published in the Journal of the Acoustical Society of America. The study is titled Characterizing three shallow-water locations off Goa, India, using passive acoustic data.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-NCL discovered effective drug for heart disease in crystalline form

Council of Scientific and Industrial Research-National Chemical Laboratory (CSIR-NCL) has discovered a new hydrate of Entresto drug that is effective in chronic heart failure.NCL has discovered a new hydrate of Entresto drug that is effective in chronic heart failure. In Pune in 2018 on new crystalline hydrate forms and different structures of Entresto, former Director Prof. Ashwini Kumar Nangia and Chief Scientist of Physics and Chemistry Department Dr. Rajesh G. Research under the leadership of Gonnad initiated the discovery. This research on crystal engineering and drug polymorphisms is published in the Royal Society of Chemistry General. Scientists have successfully discovered six different spatial types of introstrophe. It contains varying amounts of water and contains the active pharmaceutical ingredients and valsaltan and succubitrel in their anionic state together with sodium ions. Varieties of interest contain 2.0 to 3.2 percent water and exhibit stability at varying temperatures and humidity. which is important for their long-term storage (shelf life) and drug bioavailability. This is the first study of its kind to be published. Gautam R. Desiraju, Emeritus Professor at IISC Bangalore and former President of the Union of Crystallography, opined on this research that India is also leading internationally in crystallographic engineering research. Entresto is the world's best-selling drug developed for the treatment of chronic heart disease and related problems in critically ill patients. It was approved by the US Food and Drug Administration in 2015. This drug is different from other drugs containing secubitril and valsartan polymorph supramolecular complex. Most drugs on the market are single molecules. Some have fixed dosages or combinations of more than one drug. However, Entresto is the first drug to be designed using crystal engineering principles for drug production and patented in the 2000s. Most drugs have a molecular weight of less than 500 but Entresto has a molecular weight of 5748.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Experts and social workers honoured for empowering hearing- impaired students

Dr Alka Rao, principal scientist of CSIR-IMTECH was honoured for her outstanding contribution in development of Indian sign language-enabled high quality digital educational resources for science, technology, engineering and mathematics subjects in consonance with contemporary learning practices leading to holistic empowerment. To offer higher education in science, technology and engineering to hearing-impaired students, the scientists of CSIR-IMTECH had earlier initiated a process to prepare content that would help them excel in areas that were out of their reach.

To recognise their efforts in empowering hearing-impaired students, Haryana Governor Bandaru Dattatraya, at a function held in Rohtak recently, honoured selected social workers, experts and scientists.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Bengaluru: 19-seater aircraft SARAS Mk II at critical design stage

The Council for Scientific and Industrial Research-National Aerospace Laboratories (CSIRNAL), which has undertaken the design, development and certification of the SARAS Mk II, said that the 19-seater aircraft was at the critical design stage. An open-air engine test bed, an aircraft environmental systems ground test and a high-fidelity, real-time flight simulator were recently commissioned to test the various subsystems of the aircraft, the laboratory added. Dr Abhay A Pashilkar, CSIR-NAL director, said, "The aircraft will be powered by two Pratt & Whitney PT6A-67A turboprop engines with composite propellers in the tractor configuration. The Saras-Mk II is a high-wing, twin turboprop, multi-role aircraft with passenger or troop transport, VIP transport, training and cargo shipment as primary roles. The aircraft will be initially certified by the Centre for Military Airworthiness and Certification for the military role and later by the Directorate General of Civil Aviation for the civil role. "

What exactly is a green cracker? An explainer

By Akshaya Nath: In many states, the day of Diwali and the subsequent days see a dip in the air quality index, and smog is witnessed in most cities. The Supreme Court, considering the people's health and the low air quality index witnessed during Diwali, ordered the production of green crackers in 2018. The task of making the green cracker was entrusted to the CSIR-National Environmental Engineering Research Institute (NEERI). Following this, NEERI came up with a formula that helped create green crackers.

Chief scientist and Head of the EMD division, CSIR NEERI, Sadhana Rayalu, explained green crackers and said they are safer alternatives to conventional crackers. "Technically speaking, green crackers are environmentally benign by design and release comparatively less carbon footprint," Sadhana Rayalu said.

"Green crackers are just like conventional crackers and have oxidisers generally used in conventional crackers. The only differences in the green cracker are the multifunctional additives, which significantly reduce emissions," Sadhana added. The formula for green crackers suggested by the NEERI falls under a non-disclosure agreement, and only those manufacturers who have signed an agreement with the NEERI are permitted to manufacture the crackers.

CSIR-Indian Institute of Petroleum announces its new atmospheric pressure hydrogen-free low-carbon desulphurization process for crude oil and refinery streams

Crude oil and many petroleum refining streams contain Sulphur-Containing Heterocyclic Aromatic Compounds (SCHAC), which are responsible for the corrosion of assets, poor fuel quality, health issues, and environmental problems. Refinery streams like petrol, diesel, jet fuel, kerosene and fuel oil therefore need to be treated for sulphur reduction before its final end-use. Conventionally, such treatment involves expensive, high-pressure hydrogen, high-temperature operations and significant capital investment, and also substantial associated net greenhouse emissions (carbon footprint) for effecting the necessary desulphurization.

To address this, a novel single-step hydrogen-free desulphurization process has been developed by CSIR-Indian Institute of Petroleum (CSIR-IIP). Crude oil from various sources, and sulphur-containing streams from several refineries in India, have been tested; up to 90 percent of the sulphur content, depending on the specific nature of the stream being treated, can be removed by the process. The transformed sulphur compounds produced from the SCHAC components by the CSIR-IIP process are easily separable from the de-sulfurized crudes or other refinery streams via simple filtration process, and offer promise in bulk applications like road construction and coatings. The facile, inexpensive process offers a potentially transformative low-carbon desulfurization solution for bulk processing of petroleum streams at ambient pressures and mild temperatures. It has the potential to change the existing desulfurization configuration of crude oil and refinery streams in a cost-effective manner without the use of expensive hydrogen, especially for marine and industrial heating applications. Key patents have been filed internationally and additional filings, including Trademark protection, are in progress. CSIR-IIP invites interested industries to partner on a nonexclusive basis for collaborative research, development, scale-up and commercial deployment of the technology.

Hyderabad-based IICT developed technology for Rs 405 crore Gujarat plant

The researchers from city-based Indian Institute of Chemical Technology (IICT) have made major contributions in the development of Rs 405 crore Hydrazine Hydrate (HH) plant of Gujarat Alkalies and Chemicals Ltd (GACL), Gujarat, which was inaugurated by Prime Minister, Narendra Modi on October 10. The premier chemical laboratory of CSIR from Hyderabad has developed the technology for production of 10,000 tonnes per year HH (Hydrazine Hydrate), fine-tuned and validated the technology at a pilot plant installed at GACL in Dahej, Gujarat.

The joint efforts by IICT and GACL, as part of Aatmanirbhar Bharat would cut-down the import Hydrazine Hydrate, which is a super-specialty chemical, by 60 per cent in India, IICT researchers on Thursday said.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Stem Cell technology offers new hope for treating rare genetic disorders: Rakesh Mishra

"The vary nature of disease that the gene is defective makes it very difficult to identify, diagnose and the treatment is a challenge as well as extremely expensive," said Dr. Mishra. Stem cell technology has witnessed advancement that open new hopes for the treatment of rare genetic disorders which otherwise are largely undetected and also untreated. Recent research has shown exciting possibilities of having a direct intervention method for effective treatment, said Tata Institute for Genetics and Society (TIGS) Director Rakesh Mishra.

"One of great success people have started witnessing is the stem cell technology being used for genetic disorders where these cells can be taken from a healthy individual and replacing the diseased stem cells from the identified patient but there are immunological challenges in this process," he explained, in an interaction as part of the 'Stem Cell Awareness Week' organised by The Institute for Stem Cell Science and Regenerative Medicine (DBT-InStem), Bengaluru.

Dr. Mishra stated that there is another novel method of taking the patient's own cells, covert them into induced pluripotent cells (iPSC) and fix the mutation through genome editing before putting them back into the patients which will avoid any immunological issues since they are not alien cells.

"These are direct treatments of the disease using stem cells and there are many success stories in this direction," he said. The senior scientist said that the human body's tissues originate essentially from stem cell and usually there is no occurrence of rare genetic diseases because generally one gene copy inherited from either of the patents is healthy even if the other is defective. This normally the case when the parents are not closely related.

CSIR To Set Up Next-Generation Lithium-Ion Battery Manufacturing Facility In Chennai

The Centre for Scientific and Industrial Research (CSIR) is building a lithium-ion battery manufacturing facility in Chennai to reduce India's import dependence on countries like China and South Korea. The Central Electro Chemical Research Institute, a laboratory under the CSIR, is building the facility at CSIR Madras Complex at Taramani in Chennai.

The batteries manufactured at the plant would be long-lasting with around 5 to 10 times more lifetime than the currently used Li-ion batteries. They will also be smaller in size compared to the current batteries. The plant, which is expected to be ready by 2024, will produce around 1,000 batteries a day. The batteries produced in the facility would be focused mostly on consumer electronics applications.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Advanced Materials and Processes Research Institute (AMPRI), Bhopal Converted Red Mud into X-ray shielding tiles

CSIR- Advanced Materials and Processes Research Institute (AMPRI) has converted red mud into X-ray shielding tiles in a green and economically viable manner through a ceramic route by adding a certain weight percentage of high Z material and binder with it. The 12 mm thick tiles possess an attenuation equal to 2.1 mm lead at 100 kV. Moreover, the developed tile has a flexural strength of 34 N/mm2 and a breaking strength of 3369 N. These tiles can be used to build radiation shielding structures in diagnostic X-rays, CT scanner rooms, Cath labs, bone mineral density, dental X-rays, etc., instead of the toxic lead sheet to protect the public from radiation hazards.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR- Central Road Research Institute (CRRI) developed Steel Slag Technology for concretisation of roads

India has entered into an era of 'Steel" roads, by moving on from concrete to steel slag. This is a first initiative taken in the world by CSIR-CRRI, TATA Steel and Border Roads Organization who processed steel slag aggregates. These aggregates will be utilised in construction of steel slag road in strategic areas. S&T Minister endorsed virtually the dispatch of 1600 metric ton of processed Steel Slag Aggregates railway rack from Tata Steel Jamshedpur to Border Road Organization Project Arunank, Itanagar, Arunachal Pradesh.

This initiative of CSIR CRRI in partnership with TATA Steel will meet the demand of Border Roads, India's second largest and oldest Steel Company, TATA Steel has come forward under the collaborative R&D alliance with CSIR- Central Road Research Institute (CRRI) to supply processed BOF steel slag aggregates developed at TATA Steel Jamshedpur plant under CRRI technological guidance. Amongst various important points related to the technology, Dr Jitendra Singh said that Prime Minister Modi's vision for "Waste to Wealth" and NITI Aayog instructions, CSIR CRRI has developed this technology under the sponsored research project of the Ministry of Steel while virtually launching the program. He said, one third of 37 labs of CSIR in the country are working for developing suitable technologies for creating Waste to Wealth. Dr Jitendra Singh said, the demonstration of application of science for "Ease of Living" and it also underlines the Integration and Whole of Government Approach, as 4 prominent entities TATA Steel, CSIR, Border Roads Organization and Ministry of Steel came together to take "Waste to Wealth" concept to a new level. Dr Jitendra Singh said, it is worth mentioning that construction cost of this road is 30% less than the conventional road constructed with Natural aggregates, while it has 3 to 4 times higher strength. India has a vast road network and under the national highway development program, Bharatmala Project, massive Road construction is happening. The Minister hoped that the success of this technology would not only address the problem of the availability of natural aggregates for road construction but also be helpful in restraining the unsustainable quarrying of land resources.

Tata Steel Jamshedpur dispatched first consignment of steel slag 'Tata Aggreto' to BRO

Tata Steel dispatched the first ever consignment of Tata Aggreto, the company's branded steel slag aggregates to Border Roads Organisation (BRO) for construction of roads in Arunachal Pradesh under Project Arunank. By supplying a value-added industrial byproduct for road construction, Tata Steel has reiterated its commitment to building a more sustainable steel sector by adopting the principles of circular economy and has alsopioneered in a nation building initiative, the company said.

The first rake of Tata Aggreto (branded Steel Slag Aggregates) was virtually flagged off by Dr. Jitendra Singh, honorable Minister of Science & Technology, and physically by Uttam Singh, Vice President Iron Making, Tata Steel, Manoranjan Parida, Director CSIR-CRRI, Rajesh Kumar, EIC IBMD Tata Steel and Satish Pandey, Principal Scientist, CRRI, Col. Naveen Kumar Sah, Director Works Planning, Project Arunank from Platform Number 4 at Tatanagar Railway station.

Senior officials from BRO, Tata Steel, Central Road Research Institute (CRRI), Ministry of Steel, Ministry of Science and Technology, Government of India and NITI Aayog. Dr V K Saraswat, Member, NITI Aayog, Dr N Kalaiselvi, Director General, CSIR, Lt. Gen. Rajeev Chaudhary, Director General, BRO were also connected virtually during the function.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Upcoming Covid-19 generic drug has Goa imprint on it

A generic antiviral drug named Umifenovir has been developed to treat Covid-19 by premiere government drug research laboratory the Council for Scientific and Industrial Research-Central Drug Research Institute (CSIR-CDRI), Lucknow, in collaboration with Medizest Pvt Ltd, Goa. This drug is currently undergoing large-scale, multicentric Phase 3 clinical trials. The trials are expected to be completed by the end of 2022.

"After the CDRI had devised the molecules required to treat the disease, we were looking for an industrial partner to manufacture the drug, at that time one of the companies which came forward was Medizest from Goa," Dr Ravishankar Ramachandran, the nodal scientist and Project Team Lead at CSIR-CDRI told Herald.

Speaking about the drug, Dr Ramachandran informed that Umifenovir was selected from a list of 16 candidates after a detailed evaluation of the mechanism of action, feasibility of synthesis and published safety studies. "The data from studies performed at CDRI, prompted the team to propose the testing of the drug at a dose of 800 mg twice a day, as opposed to the previously approved maximum dose of 200 mg three times a day.

Following approval by the Drug Controller General of India (DCGI), Umifenovir was tested in a Phase III, randomised, double-blind, placebo controlled clinical trial for efficacy, safety and tolerability in non-severe Covid-19 patients last year," he said. "Umifenovir has an excellent safety profile. It has been used as a safe, over-the-counter drug to treat adults, children and pregnant women for influenza and pneumonia for over 20 years in Russia, China and other countries," the CSIR-CDRI chief scientist said. He said that the faster recovery of patients could reduce virus shedding and consequent spread of the infection to others.

"The drug could also be tested in special populations such as pregnant women and children, a group for which Covid-19 specific antiviral drugs are not currently indicated. The current ongoing Phase 3 will help establish the efficacy and safety of the drug in a larger number of subjects, paving the way for marketing approval for Medizest," the senior scientist added.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Environmental DNA-based assay to detect invasive catfish in waterbodies

Invasive alien species are a severe threat to biodiversity, causing local extinction of native species and impacting ecosystem services, human livelihood, economy, and health. The North African Sharptooth catfish is one such species that was illegally introduced in India for aquaculture purposes. Now the species has invaded most freshwater ecosystems. "The ecological damage is staggering that the Indian government has eventually banned this species from culturing and selling. Yet the control and management of this species is an uphill task, which requires the primary task of detecting the presence of this species in waterbodies and mapping its distribution," said Govindhaswamy Umapathy, Senior Principal Scientist of Centre for Cellular and Molecular Biology (CSIR-CCMB).

While the conventional methods to detect invasive species, like using nets, traps, and visual observations, are cumbersome, the researchers from CCMB now have developed Environmental DNA (eDNA)-based molecular methods that provide a time and cost-effective alternative. eDNA is defined as"genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of the biological source material. " It is an efficient, non-invasive and easy-to-standardise sampling approach. eDNA can be obtained from ancient and modern environments. Coupled with sensitive, cost-efficient and ever-advancing DNA sequencing technology, the technique is increasingly being used for biodiversity monitoring.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR IMMT developed 'groundwater de-fluoridation technique'

The fluoride content in water is a major problem in Odisha that leads to various diseases.

This Groundwater De-fluoridation technique is cheap, implementable, chemical free and easy to handle. The absorption process is used for the de-fluoridation of groundwater. The metal ions from the soil are used to make the nano particles and then it is converted into the granules, which will be packed in a pouch and are easily separable.

One kilogram of these granules can purify 2000 liter of fluoride from the contaminated water.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Hyderabad: NGRI researchers find platinum reserves in Karnataka gold mine

City-based National Geophysical Research Institute (NGRI) researchers have found platinum reserves at Hutti underground gold mines in Karnataka. Another rare mineral, Skaergaardite, was also discovered. Researchers said the reserves were yet to be quantified, and this is the first report of platinum and Skaergaardite at Hutti, India's only functional gold mine. The mines were under the Nizam's control as they lied in the erstwhile Hyderabad Deccan state between 1887 and 1947. They suggested further studies. Apart from platinum, the palladium part of Skaergaardite is more valuable than gold.

"We used powder X-ray diffraction technique facility at NGRI to report the occurrence of platinum and Skaergaardite in Hutti underground mines. We used a quartz-bearing sample from the Hutti mines. The quartz samples are found to be associated with intense chemical alterations. Both Skaergaardite and platinum occurrence were revealed in the study. Further research is planned on this mineral association with primary gold ore in Hutti mine," researcher PV Sunder Raju of NGRI told TOI. NASA Mars mission 2020 Perseverance utilises powder XRD to understand the chemical composition of materials. The presence of Skaergaardite was first reported in the Skaergaard intrusion of Kangerdlugssuaq area, Greenland (Denmark).

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Mouse deer pheromones helped CCMB scientists in species recovery programme

Mouse deer, or Indian chevrotain, plays a major role in the forest ecosystem as a seed disperser, and serves as an important prey for many carnivores. Though commonly found in most forested areas, it has been listed as endangered in the Wildlife Protection Act due to frequent hunting for their bushmeat. Scientists at the Laboratory for the Conservation of Endangered Species (LaCONES) at CSIR-Centre for Cellular and Molecular Biology (CCMB) has successfully initiated a conservation breeding and species recovery programme of mouse deer in 2010 in collaboration with the Nehru Zoological park here and support from Central Zoo Authority. Scientists involved in studying the reproductive behaviour of the mouse deer in captivity realised that it is the ' sex pheromones' (androstenone and androstanol) in the species that play a role in their reproduction by bringing opposite sexes together for mating in the wild as they are solitary creatures.

"Our findings have already helped in breeding of mouse deer at Nehru Zoological park. It will also help other Indian zoos and elsewhere," said LaCONES scientist G. Umapathy, whose group studied the reproductive behaviour of mouse deer in captivity, in an official release.

Recycling of old roads became easy and economical, CRRI developed new technology

Central Road Research Institute (CRRI) has developed 'Rejupave technology' for repairing old roads. In this technique, 5 to 10 cm coal tar layer is put above the road. Due to this, the road gets higher.

CSIR, CRRI & Verma Industries will help to reuse upto 60 percent material by uprooting coal tar layer. Apart from this, it will be cost friendly as well as eco-friendly. Using this technology, CRRI constructed 1 km road of National Highway in West Bengal.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-CFTRI with JustMyRoots developed biodegradable thermo-stable containers for cold and hot supply chains for food products

CSIR-CFTRI (Council of Scientific & Industrial Research) (Central Food Technological Research Institute) with JustMyRoots, has developed biodegradable thermo-stable containers for cold and hot supply chains for food products. The containers developed for hot food chain supply are capable of keeping perishable food hot between 42-65 degrees Celsius for up to 10 hours. This technology will reform food delivery for restaurants located 10+ km away or even in another city.

The available technologies are rigid non-biodegradable containers and therefore not suitable for reverse logistics. As a result they do not help in reducing carbon footprint, nor capable of holding food at the required temperatures for as long as JustMyRoots is offering.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

SIVARIKA Seaweed is a technology provided by CSIR-CSMCRI

The SIVARIKA Seaweed technology is provided by CSIR-CSMCRI. The SIVARIKA Seaweed functions as a metabolic bio enhancer. It contains proteins, carbohydrates, inorganic salts and other inherent nutrients, vitamins, plant growth hormones like auxin, cytokinin and gibberllins, betaines and mannitol etc. This product is cultivated and harvested from the Indian coast and is a source of livelihood of many fishermen families. This farmer friendly product aims to boost the productivity of crops, facilitate in achieving higher yield and will aid in improving the soil health.

Krishak Bharati Cooperative Limited (KRIBHCO) is one of the pioneer fertilizer organization of India having its manufacturing unit at Hazira, Surat to whom the technology is transferred. KRIBHCO launched SIVARIKA. The SIVARIKA granules are fortified with seaweed extract derived from red and brown algae.

Presented by:

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-CIMFR Transferred Soft Coke Making Technology to Five MSME

In 1995-96, CSIR-Central Institute of Mining and Fuel Research (CIMFR) in Dhanbad developed the soft coke technique for various applications. After 2020, this technology was transferred to 11 farms in India. Currently, soft coke produced using this technology can be used both domestically and in the iron industry.

The benefits of this technology include:

- Reduces the coking time and thus increase productivity
- Partially replaces the need of coal; hence reduces the import of coal
- Reduces pollution

Soft Coke Plant Under Construction

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Innovations and Contributions by CSIR labs

In this issue:

Unmanned Aerial Vehicle (UAV), a Flying Air Quality Laboratory developed by NEERI. (Pic by Satish Raut)

CSIR-NEERI Developed KSHAN AQ, a Flying Air Quality Laboratory

Combining ingenuity with practical application, NEERI-KSHAN AQ-the air sapling multicopter has been developed by the Nagpur based CSIR-National Environmental and Engineering Research Institute (NEERI).

- **Air pollution is a serious issue in India with significant health risks.**
- **India has 22 of the world's top 30 polluted cities.**
- **NEERI developed a drone, NEERI-KSHAN-AQ, to track Particulate matter (PM) 2.5 levels effectively.**
- **This drone can fly at various altitudes upto 120m.**
- **Lightweight sensors are used on the drone.**
- **Targeted measures can be taken based on pollution sources.**
- **NEERI plans to expand drone sensors for monitoring other pollutants.**

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Extract from 'CSIR Matters' (Edition 06-10 January 2023)

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-IMMT Among 6 Organisations Working on Extracting Valuable Materials from Red Mud

- **CSIR-Institute of Minerals and Materials Technology (IMMT) in Bhubaneswar extracts valuable materials from red mud.**
- **Red mud results from alumina production.**
- **The project separates alumina, iron oxide, and REEs (rare earth elements).**
- **These materials have various industrial uses.**
- **The initiative tackles red mud's environmental challenges.**
- **It promotes sustainable utilization in manufacturing and construction.**
- **It highlights red mud as a REE source.**

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Innovations and Contributions by CSIR labs

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Image credits: groundreport.in

CSIR-AMPRI's Breakthrough: Transforming Parali Stubble into Eco-Friendly Hybrid Wood

Researchers at the CSIR Advanced Materials and Process Research Institute (AMPRI) in Bhopal had developed a waste-to-wealth technology that turned toxic fly ash from thermal power plants into eco-friendly hybrid wood. This technology is now being transferred to deriving wood from agricultural stubble (parali).

- **This wood, from agricultural stubble, is cheaper and stronger than traditional wood.**
- **30% cheaper and 20% stronger than conventional particle wood and plywood.**
- **It's useful for doors, panels, roofing, and insulation.**
- **Haryana and Chhattisgarh companies have adopted the technology.**
- **It tackles stubble burning, improves air quality, and saves trees.**
- **The project began in 2010 and expanded to include jute in West Bengal.**
- **Haryana sought the technology in 2020 to address stubble issues.**

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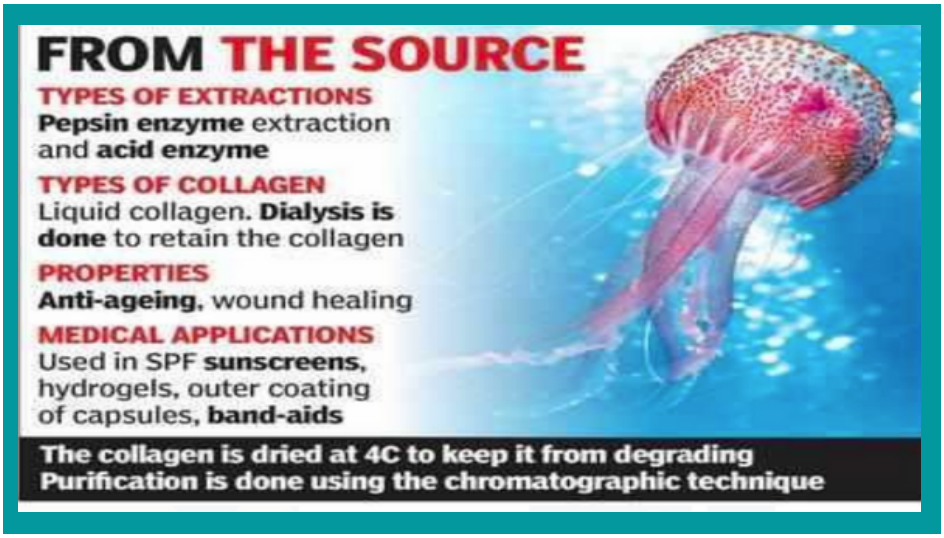

CSIR-NIO's Breakthrough- Extracting Collagen from Jellyfish

Scientists at the CSIR-National Institute of Oceanography (NIO) in Goa, have found a way to tap the state's marine life for collagen. India has been largely dependent on China for its collagen requirements.

- **Collagen is used in skincare and pharmaceuticals.**
- **Local jellyfish species are used.**
- **This discovery reduces India's dependency on China for collagen.**
- **Marine sources like prawns, mackerels, crabs, and sea urchins can also provide collagen.**
- **The extracted collagen has anti-aging properties and nutraceutical potential.**
- **Researchers are assessing SPF (Sun Protection Factor) values of the collagen.**

CSIR-CIMAP Developed a New Variety of Peppermint

CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) in Lucknow has released a newly developed variety of peppermint (Mentha piperita) 'CIM-surass'. A room freshener herbal vaporizer 'Aero-Clean' has also been released.

- **This new peppermint variety has over 70% menthol content.**
- **CSIR-CIMAP plays a vital role in providing value-added planting material to farmers during their 'Kisan Mela.'**
- **Till date, CSIR-CIMAP has developed as many as 12 varieties of mint that have been adopted by farmers.**

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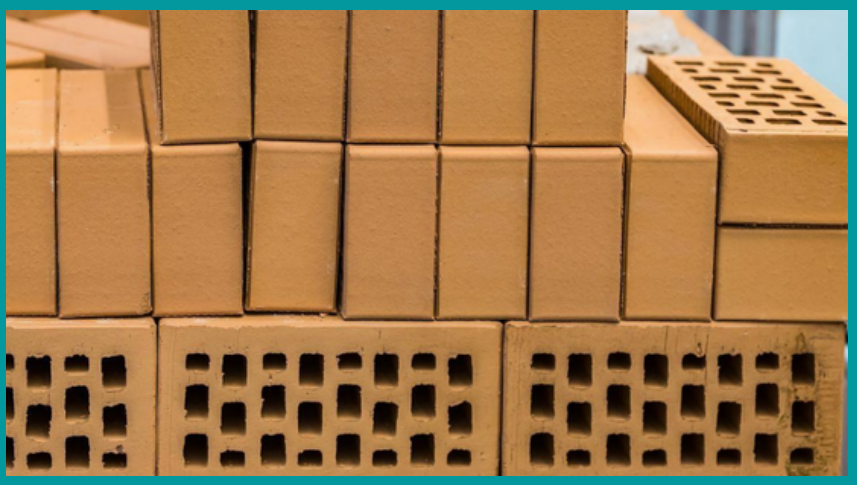

Image credits: thebetterindia.com

CSIR-NIIST Collaboration: Turning Waste Sand into Bricks

CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) at Pappanamcode in Thiruvananthapuram, Kerala have innovated a technique that can convert sand into bricks that can be used by the construction sector.

- **Technology: Cost-effective Compression Moulding Technology**
- **Silica bricks are eco-friendly and address the increasing demand for construction materials in India**
- **Autokast Ltd, a Kerala government undertaking, generates 700 tonnes of foundry waste sand monthly**
- **Technique developed with CSIR-NIIST to convert it into bricks**
- **The manufacturing unit can produce 4,000 bricks per day**
- **The project is part of the 'Waste to Wealth' research program by CSIR**
- **The bricks produced meet IS 1077 standards and can come in various aesthetically appealing colors for interior design purposes**

Advantages :

- **Simple compression moulding process at a pressure of 50 to 60 MPa**
- **Use of cement only up to 8%**
- **High compressive strength as well as wet strength**
- **Green Process**
- **No CO2 release**
- **Wide range of products [Bricks, Blocks and Panels]**
- **Cost-effective Compression Moulding Technology**

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Image credits: hindustantimes.com

Image credits: indiatimes.com

CSIR-CDRI Developed DNA Gel Stain Needed in RT-PCR

CSIR-Central Drug Research Institute (CDRI) in Lucknow has developed an indigenous DNA gel stain called 'GreenR.'

- **'GreenR' is crucial for RT-PCR and other diagnostic tests.**
- **Reduces India's reliance on imports for these tests.**
- **'GreenR' is non-mutagenic, cost-effective, and easy to dispose of.**
- **It was created in collaboration with Biotech Desk Private Limited in Hyderabad.**
- **It eliminates the need for toxic and expensive imported dyes, making DNA and RNA staining safer and more affordable.**

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In this issue:

CSIR-NCL Sets Up Sanitary Pad Disposal Mechanism on Campus

CSIR-National Chemical Laboratory (CSIR-NCL) in Pune has established a sanitary pad disposal mechanism on its campus to create a better work environment for its women researchers.

- **This system recycles used sanitary pads into products like flower pots, pencils, diaries, and separates plastic content for paving stones.**
- **Padcare, a local start-up incubated at NCL's Venture Centre, assisted in implementing this initiative.**
- **It addresses the need for proper menstrual waste management and contributes to sustainability.**
- **The initiative improves the work environment for women researchers at CSIR-NCL.**
- **Padcare has also installed similar systems at other educational institutes, benefiting around one million menstruators across India.**

CSIR-CSMCRI Scientists Develop New Membrane for Cheaper Green Hydrogen

Scientists at the CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI) in Bhavnagar, Gujrat have developed a new membrane technology that could significantly reduce the cost of green hydrogen production.

- **New membrane is less expensive, more durable than existing membranes.**
- **The institute has secured an international patent for this membrane.**
- **The technology transfer was made to GFCL Solar and Green Hydrogen Products Ltd.**
- **This membrane technology has applications in hydrogen production, fuel cells, and energy storage batteries.**

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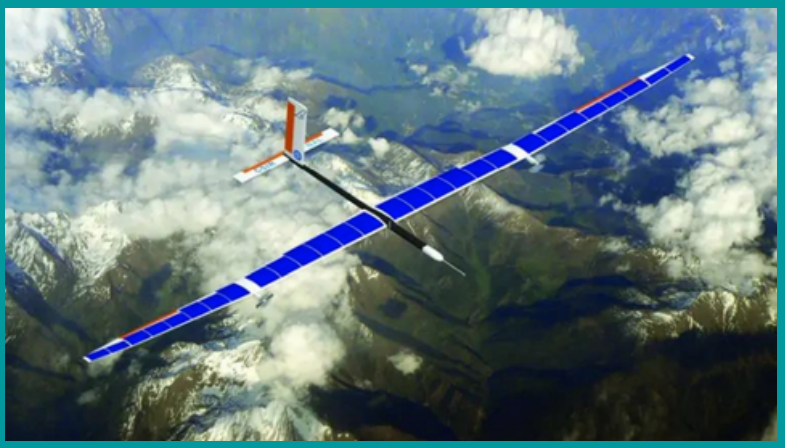

India's First High Altitude Platform to be Unveiled by CSIR-NAL

The CSIR-National Aerospace Laboratories (NAL) is set to launch India's first High Altitude Platform (HAP) in May.

- HAPs are like drones but can fly at 18-20 km above the Earth's surface.
- First trial will fly up to a range of around 3 km.
- The full-fledged HAP will be ready in 2-3 years.
- HAPs are powered by solar energy and equipped with high-efficiency solar panels and energy-dense batteries.
- Applications of HAPs include border surveillance, emergency communications, pollution monitoring and more.
- Hindustan Aeronautics Ltd (HAL) and startups in India are also exploring HAP technology.
- HAPs are considered a cost-effective alternative to satellites for various services.
- Concerns exist about safety, security and environmental impact related to HAPs.

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CSIR-AMPRI Helps Shed Light on Effectiveness of Homoeopathy Medicines

A three-year study by Bhopal's CSIR-Advanced Materials And Processes Research Institute (AMPRI) and Government Homoeopathic Medical College And Hospital, Bhopal (GHMCH) with indigenously developed experimental setup has confirmed that each homoeopathy medicine has its own electromagnetic signature under excitation frequency.

- **Homeopathic medicines have unique electromagnetic signatures even in low concentrations.**
- **Homeopathic medicines were found effective in enhancing natural immunity to combat various ailments.**
- **The study marks a significant advancement in molecular homeopathy.**
- **It paves the way for developing instruments for quality control of homeopathic medicines.**
- **The research was published in Elsevier's Science Direct, a renowned academic publishing company.**

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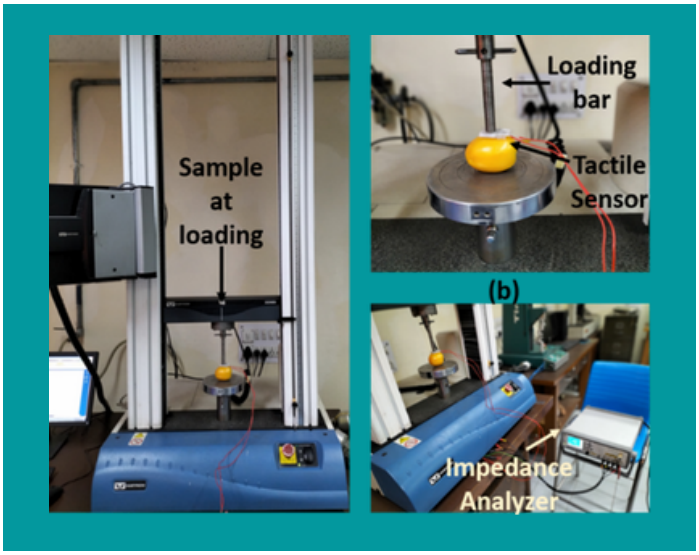

IIT Jodhpur, IIT Delhi, and CSIR-CEERI Researcher's Create Sensor for Detecting Fruit Ripeness

Indian Institute of Technology Jodhpur researcher has successfully created and demonstrated a cost-effective and highly sensitive tactile pressure sensor for detecting fruit ripeness in collaboration with Indian Institute of Technology Delhi and CSIR-Central Electronics Engineering Research Institute (CEERI).

- **The sensor uses nano needle-textured PDMS (Polydimethylsiloxane) as the dielectric layer.**
- **It allows flexible and large-scale fabrication without lithography.**
- **Researchers measured the elastic modulus and capacitance to assess ripeness in different tomato types.**
- **Current methods like chemical analysis and electrochemical sensing can be expensive and impractical to ripeness stages.**
- **Pressure, mechanical stiffness, and firmness data can also be measured for various fruits.**
- **It can revolutionize fruit sorting, increase efficiency, reduce waste, and enhance the quality of exported fruits.**
- **Integrating the sensor with a robotic arm enables high-throughput sorting of fruits based on ripeness and quality during plucking or transportation.**

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