Edition: 01-05 April 2023

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-NEERI's Formula for Greener Crackers

Nagpur based CSIR - National Environmental Engineering Research Institute (NEERI) set up a Raw Materials/Chemicals, Composition, Emissions (RACE) testing facility at the AAA College of Engineering and Technology in Sivakasi, Tamil Nadu to test green crackers.

- **CSIR-NEERI developed a formula for green crackers, reducing emissions by 20%-30%.**
- **It will help test emissions and noise levels of green crackers made in Virudhunagar district.**
- **Around 1,000 units in Virudhunagar are registered with NEERI for producing green crackers.**
- **An MoU was signed between TANFAMA and CSIR-NEERI to establish this testing laboratory.**
- **It will also reduce delays in testing and certifying green crackers produced in the district.**

Novel features:

- **Novel concept of exploiting exothermic heat of materials (zeolite, clays, silica gel, lime and Aluminium) for bursting of crackers**
- **Shows matching performance in sound (100-120dBA) with commercial crackers**
- **Overcomes issues of particulate and gaseous emissions**
- **PM reduction by more than 80% for peroxide based crackers**
- **PM reduction by 30% for water based crackers**
- **Significant NOx and SOx reduction envisaged**
- **Reduction in cost due to avoidance of KNO_3 and Sulphur .**

Presented by:

Edition: 06-10 April 2023

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-NGRI Scientists Discover Light Rare Earth Elements in Andhra Pradesh

Scientists at CSIR-National Geophysical Research Institute (NGRI) in Hyderabad have discovered Light Rare Earth Elements (REE) in Ananthapur district, Andhra Pradesh.

- **These elements include Lanthanum, Cerium, Praseodymium, Neodymium, Yttrium, Hafnium, Tantalum, Niobium, Zirconium, and Scandium.**
- **These REEs are crucial in various industries, including electronics, medical technology, aerospace, automotive, and defense.**
- **They are essential for manufacturing permanent magnets used in modern electronics, wind turbines, vehicles, and more.**
- **The discovery was part of the SHORE (Shallow subsurface imaging of India for Resource Exploration) project funded by CSIR-India, aimed at understanding Rare Metals (RM) and REE metallogeny, assessing resources, and identifying economically viable sites in Andhra Pradesh.**
- **Further deep drilling will be conducted to confirm the consistency of REE presence in depth.**

Sodium-Ion Batteries: A Safer and Greener Alternative by CSIR-NCL

- **CSIR-National Chemical Laboratory (NCL), Pune, is making strides in developing Sodium-Ion Batteries (SIBs) for commercial use.**
- **SIBs offer sustainability and lower cost per kilowatt-hour, making them attractive for large-scale energy storage.**
- **SIBs use sodium, the fourth-most abundant element on Earth, and aluminium current collectors, which are cost-effective and lightweight.**
- **SIBs are considered safer for transport compared to Lithium-Ion Batteries (LIBs) and offer high power and fast charging.**
- **Researchers at CSIR-NCL have explored strategies to improve SIB energy density for grid-storage applications.**
- **A CSIR-NCL spin-off company, Rechargion Energy Pvt. Ltd, is involved in commercializing SIBs based on this research.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-NGRI and JNTU Reveals Cancer Risk from Crops Irrigated with Musi River

Crops grown from Musi river water pose moderate risk of cancer in the long run as they contain heavy metals, according to a new study by Hyderabad based researchers of CSIR-National Geophysical Research Institute (NGRI) and Jawaharlal Nehru Technological University (JNTU).

- **Musi river water used for irrigation in South India contains heavy metals.**
- **Crops grown with this water pose a long-term cancer risk due to heavy metal contamination.**
- **Lead contamination likely comes from used batteries and automobile exhaust.**
- **Health risks were assessed for different age groups and found to be of moderate concern.**
- **Soil and water salinity is increasing, impacting agriculture and groundwater quality.**
- **Heavy metal contamination can have a devastating impact once it enters the food chain.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-CCMB's Ancient DNA Study Unlocks Pattanam's Mysteries

- Pattanam, in Kerala, is believed to be part of the ancient port city of Muziris.
- Study of CSIR-Centre for Cellular & Molecular Biology (CCMB), Hyderabad scientists and PAMA Institute, Kerala supports this historical significance.
- DNA analysis of ancient skeletal samples reveals South Asian and West Eurasian genetic lineages.
- It played a crucial role in trade and cultural exchanges.
- Archaeological findings suggest vast urban settlement.
- It signifies continuous multicultural interaction in ancient South India.
- This study sheds light on the origin and genetic makeup of Pattanam's inhabitants.
- Published in the journal "Genes," it reinforces the site's diverse early historical occupation.

CSIR-IIP's Bio-Jet Fuel Could Transform India's Aviation Industry

- CSIR-Indian Institute Of Petroleum (CSIR-IIP) in Uttarakhand develops sustainable aviation fuel (SAF) from cooking oil and oil-bearing plants.
- IIP collaborates with Boeing, Indigo, Spicejet, and Tata Airlines, to promote SAF production.
- Received provisional certification for Indian Air Force, pending international certification for commercial airline use.
- Can significantly reduce air pollution and greenhouse gas emission.
- Mangalore Refinery and Petrochemicals Ltd. to set up India's first SAF plant, with more expected by 2025-26.
- Challenges include feedstock supply issues, infrastructure, and policy support.
- A Bio-Aviation Turbine Fuel Program Committee formed to facilitate clean jet fuel production in India.

Presented by:

Extract from 'CSIR Matters' (Edition 26-30 April 2023)

Edition: 01-05 May 2023

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Frog swabbing to collect Bd fungal samples

Amphibian Conservation Gets Boost with CSIR-CCMB's Research

Researchers from the CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad, in collaboration with researchers in Australia and Panama have established a new test for successful diagnosis of Chytridiomycosis.

- **Chytridiomycosis, a devastating amphibian disease caused by fungal pathogens, has driven over 90 amphibian species to extinction globally.**
- **The team developed a novel marker for the disease and published their findings in 'Transboundary and Emerging Diseases'.**
- **The new test revealed a 70% infection rate in amphibians.**
- **This innovative diagnostic tool is universal, sensitive, specific, repeatable, and cost-effective, making it ideal for efficient Chytridiomycosis surveillance worldwide.**
- **The research can shed light on disease transmission and infection pathways and aid amphibian conservation efforts.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-CSMCRI's Breakthrough: Potash Fertilizer from Waste Ash

The CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI) in Gujarat, has successfully developed a process to extract sulphate of potash (SOP) and muriate of potash (MOP) from the spent-wash ash produced by sugarcane molasses-based distilleries,

- **Spent-wash, a by-product of alcohol production, is typically managed through composting or incineration, producing ash with potash content.**
- **Recovers up to 90% of potash from distillery boiler ash, repurposing non-salt solids into bricks.**
- **Reducing the need for costly potash fertilizer imports.**
- **The technology developed by CSMCRI has been licensed for a Rs 57crore plant in Uttar Pradesh.**

CSIR-CRRI And CSIR-NPL Develops Tiles Using Waste Materials

CSIR-Central Road Research Institute (CRRI) and CSIR-National Physical Laboratory (NPL) scientists in Delhi develop high-strength tiles from waste materials.

- **These tiles utilize multi-layered plastic and fly ash, addressing plastic waste and aluminum industry's red mud disposal issue.**
- **The tiles are designed to withstand high pressures and can support up to 20 tonnes.**
- **These tiles are suitable for pavements, roofs, walls, and potentially road construction.**
- **They offer a modular structure solution for roads, reducing the need for road digging and repairs.**
- **The prototype tiles are flexible, nearly as tough as concrete, and ideal for Indian roads.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image credits: indiatimes.com wikipedia.com

CSIR-NCL licenses technology to produce nanocellulose through fermentation process

CSIR-National Chemical Laboratory (CSIR-NCL), Pune, licensed the technology for producing bacterial nanocellulose for wound care and cosmetics applications.

- **The technology uses a high-yield fermentative process to produce high-value bacterial nanocellulose films from low-cost carbon sources.**
- **Developed and validated at the lab scale by Dr. Syed Dastager's team at CSIR-NCL.**
- **The nanocellulose boasts high purity levels and unique micromorphology.**
- **Bacterial nanocellulose offers advantages like high tensile strength, biodegradability, and biocompatibility.**
- **The technology has applications in wound care and cosmetics.**
- **Technology licensed to Rapidcure Healthcare Pvt. Ltd.**
- **Rapidcure Healthcare aims to develop products utilizing this technology, focusing on wound care and cosmetics.**
- **Collaboration between CSIR-NCL and Rapidcure Healthcare aims to bring this technology to commercialization for societal benefits.**

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Edition: 16- 20 May 2023

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image source: boldsky.com

IISER Pune and CSIR-CDRI Researchers Discover New Antibiotic for HAIs

The new antibiotic found effective against hospital-acquired infections (HAIs) was discovered jointly by researchers of the Indian Institute of Science

Education and Research (IISER) in Pune, and CSIR-Central Drug Research Institute (CSIR-CDRI), Lucknow.

- **HAIs cause serious health issues, including morbidity, mortality, and treatment costs.**
- ***A. baumannii* is a challenging MDR pathogen common in HAIs.**
- **The antibiotic shows promise in animal models; human trials are pending.**
- **Potential impact on severe burn injuries, wounds, pneumonia, and more.**
- **WHO recognizes the need for novel antibiotics against drug-resistant pathogens.**

CSIR-CIMAP Sets Up India's First Sustainable Aroma Cluster

The CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) launched India's first of its kind 'Sustainable Aroma Cluster' in Bhagauli village of Barabanki in Lucknow.

- **Demonstrates innovative farming methods to farmers for productivity, soil health, and biodiversity.**
- **High-yield mint variety resistant to stress factors planted in the cluster.**
- **Solar drones showcased for efficient pesticide and fertilizer spraying.**
- **Soil health cards provided to participating farmers.**
- **Solar-powered mint oil extraction units inaugurated.**
- **Early Mint Technology saves water, reduces weeds, and enables multiple harvests.**
- **A model for sustainable agriculture supporting zero-carbon emission goals.**

Image source: hindustantimes.com

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Edition: 16- 20 May 2023

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-CEERI Develops Handheld Colposcope for Cervical Cancer Screening

CSIR-Central Electronics Engineering Research Institute (CEERI) in Pilani has now developed an indigenous IoT-enabled handheld colposcope system for cervix condition analysis and cervical cancer screening

- **Aims to address high cervical cancer cases in India.**
- **Indigenous system is cost-effective with smartphone app connectivity, cloud communication, and predictive software.**
- **Tested in hospitals and commercialized to M/s Divine Meditech for mass production.**
- **Expected launch in the Indian market within 3-6 months.**

CSIR-IICT Launches Atmospheric Water Generators at Mumbai Railway Stations

Hyderabad-based CSIR-Indian Institute of Chemical Technology (IICT) has collaborated with Maithri Aquatech to install atmospheric water generators at different locations in Mumbai.

- **17 Meghdoot Air Water Plants deployed at six key local railway stations.**
- **Technology utilizes atmospheric moisture to produce safe drinking water.**
- **The water undergoes filtration to meet WHO and Indian potable water standards.**
- **Initiative aims to provide clean and safe drinking water to commuters.**

Image source: ANI news

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Edition: 26- 31 May 2023

SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image credits: indiatimes.com

CSIR-IITR Develops Innovative Air Pollution Reduction Device

- CSIR-Indian Institute of Toxicology Research (IITR) in Lucknow develops a hi-tech air pollution reduction device.
- Device aims to reduce Particulate Matter: PM10 and PM2.5 concentration & gaseous pollutants from ambient air.
- It stands out for its ability to tackle gaseous pollutants, a feature not present in current pollution reduction devices.
- The project received a grant of Rs 34.79 lakh from DST-Science and Engineering Research Board (SERB).
- Fabrication of the device is underway through an external agency based on CSIR-IITR's design.
- Computational simulations show that the device can reduce fine particulate matter by up to 80% and gaseous pollutants by up to 60%.
- It also oxidizes other critical pollutants like carbon monoxide, hydrocarbon, and volatile organic compounds.
- CSIR-IITR has been monitoring air pollution in Lucknow since 1997 and is working on improved air quality solutions.

Genome Editing: CSIR-CIMAP Targets Nicotine Reduction in Tobacco

CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) in Lucknow has successfully reduced nicotine content in the Petit Havana Tobacco plant variety by 60-70% using genome editing.

- CIMAP plans to lower nicotine in commercial tobacco plant varieties, including those used in cigarettes, cigars, and beedi, to facilitate smoking cessation.
- By blocking or regulating specific biosynthetic pathways for nicotine production in the plant's root tissue, the nicotine content in leaves can be controlled.
- CRISPR-Cas9 genome-editing technology was utilized for this purpose, allowing for precise DNA sequence editing.
- Additionally, CIMAP identified a transcription factor in tobacco plants that plays a role in controlling nicotine production and manipulated it to lower nicotine content.

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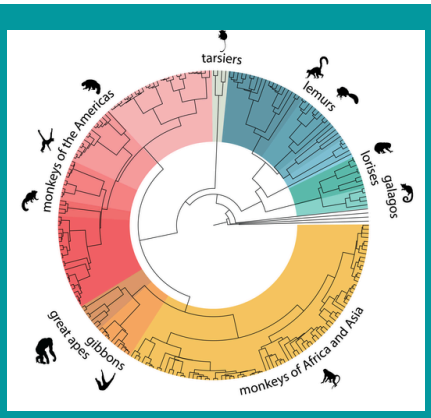
SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

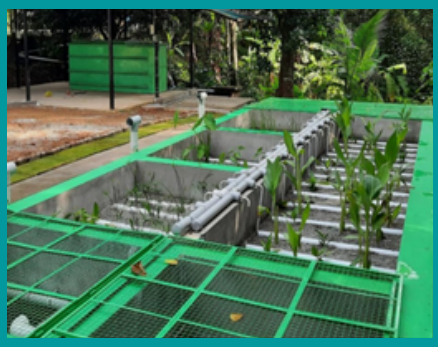


CSIR-CCMB's Primate Genome Research Offers Valuable Clues for Conservation

Scientists from the CSIR-Centre for Cellular and Molecular Biology (CCMB) in Hyderabad have conducted two new studies that have produced vital insights into the genetic variety of primates and their evolution.

- **Analyzed over 800 individuals from 233 primate species, including 19 in India.**
- **Identified 4.3 million genetic mutations relevant to human disorders.**
- **Published in Science, creating a comprehensive primate genomic database.**
- **Genetic diversity found across regions and species, crucial for evolution and conservation.**
- **Indian primate species with lower genetic diversity need conservation.**

CSIR-NIIST to Inaugurate Treatment Unit for Recycling Greywater



CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) researchers at Thiruvananthapuram have developed a bio-eco engineering system for treating greywater.

- **A model treatment unit opens on June 5 for Environment Day celebrations.**
- **The system combines an anaerobic treatment unit and a planted filter bed.**
- **It can handle high-strength greywater and removes about 50% of contaminants.**
- **Treated water can be used for various purposes, reducing space requirements.**
- **NIIST plans to implement this system in residential and commercial areas for sustainable greywater treatment.**

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Innovations and Contributions by CSIR labs

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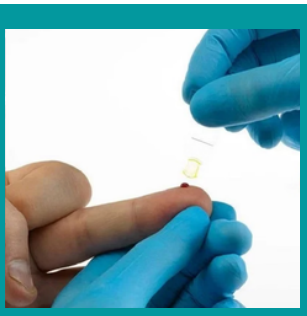

CSIR-IITR Develops Affordable Rapid Haemoglobin Testing Kit

- **CSIR-Indian Institute of Toxicology Research (IITR) in Lucknow has developed a cost-effective and user-friendly rapid haemoglobin testing kit called 'SenzHb'.**
- **SenzHb is a paper-based haemoglobin test kit that costs only ₹10 per test**
- **It provides accurate results in just 30 seconds.**
- **It eliminates the need for extensive laboratory equipment and can be used by anyone.**
- **The kit includes a paper-based sensor, and users simply need to place a drop of blood on the strip and observe the color change to determine haemoglobin levels.**
- **Extensive validation has been conducted to ensure the accuracy and reliability of SenzHb.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Enhanced Productivity: CSIR's Furnace Technology Benefits MSMEs

CSIR-NML (National Metallurgical Laboratory), Jamshedpur and CSIR-IMMT (Institute of Minerals and Materials Technology), Bhubaneswar have jointly transferred "Efficient Brass Melting Furnace" technology.

- **This furnace is a modified version of traditional artisans' furnaces and offers several advantages:**
  - **Reduces energy consumption by 20-40%.**
  - **Decreases melting time by 20%.**
  - **Produces less pollution.**
  - **Increases productivity by 30%.**
  - **Cooler working ambience.**
- **The furnace uses low-cost materials, making it suitable for artisans and MSMEs.**
- **Technology transferred to Aquatic Industries Pvt. Ltd.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-CLRI Innovates Leather Production from Fish Skin and Chicken Feet

CSIR-CLRI (Central Leather Research Institute) in Chennai has developed technology to create leather and products from chicken feet skin.

- **Chicken feet & fish skin is a cost-effective by-product of poultry and serves as a unique raw material for leather.**
- **The technology yields high-strength leathers with desirable properties**
- **Products like pouches, handbags, wallets, and watch straps can be manufactured.**
- **Unlike conventional processes, this method avoids the use of sodium sulphide, eliminates sludge formation, and generates no solid waste.**
- **The technology supports small-scale leather and product industries**
- **Contributes to waste utilization and rural industrialization.**

CSIR-CSMCRI Develops UV-Shielding Bio-Based Furanic Polymers

The CSIR-CSMCRI (Central Salt and Marine Chemicals Research Institute) has developed bio-derived furanic polymers (BFP) from biomass.

- **BFP serves as both a (Ultraviolet) UV-shielding agent and a mechanical strength enhancer for various products, including thin films, bottles, pharmaceutical tablet strips, windows, and more.**
- **This technology offers a sustainable alternative to petroleum-derived polymers.**
- **BFP demonstrates superior UV-shielding efficiency compared to many commercial compounds.**
- **It can be blended with natural bio-polymers for fully bio-based, bio-degradable products.**
- **The technology is currently licensed and has potential applications in diverse industries.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

image credits: thebetterindia.com

CSIR-CSMCRI Licenses Microalgae Biodiesel Technology to Tata Chemicals

The CSIR-CSMCRI (Central Salt and Marine Chemicals Research Institute), Bhavnagar has licensed its technology to extract crude oil from a species of microalgae to Tata Chemicals Limited (TCL), Mumbai for production of automobile fuel.

- **CSMCRI will assist TCL in setting up a facility in Gujarat to cultivate the microalga species and extract crude oil from it.**
- **It can be used as biodiesel for automobiles.**
- **Microalgae are considered an ideal industrial raw material due to their rapid growth, high photosynthesis efficiency, and the ability to accumulate bioproducts within their cells.**
- **TCL is the first private company to enter into an agreement with CSMCRI for microalgae cultivation and biodiesel extraction.**
- **The technology developed by CSMCRI has been in development for 20 years and is scalable to commercial levels.**

CSIR-IICT's Biogas Technology Utilized for Livestock Waste Disposal

The CSIR-Indian Institute of Chemical Technology (IICT) in Hyderabad has developed high-rate biomethanation technology for generating biogas and biomanure from organic waste.

- **The technology, based on Anaerobic Gaslift Reactor (AGR), has been adopted for livestock waste disposal at a modern slaughterhouse.**
- **The AGR technology processes 500 kg of solid waste and 40 cubic meters of liquid waste daily to produce 80 cubic meters of gas and 40 cubic meters of liquid biomanure for plants.**
- **CSIR-IICT has previously set up AGR-based biogas plants in various locations, including vegetable markets, generating biogas for cooking and electricity.**
- **The institute is open to testing AGR technology for various waste types and certifying the safety of the biomanure.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Quinoa Germ: A Rich Source of Nutrition Unveiled by CSIR-CFTRI

CSIR-CFTRI (Central Food Technological Research Institute) in Mysore has successfully developed a dry physical process for the separation of the highly nutritious germ from Quinoa (*Chenopodium quinoa*), a superfood renowned for its exceptional nutritional profile.

- **Quinoa germ is rich in protein, unsaturated fatty acids, omega-6, omega-3 fatty acids, minerals, and antioxidants.**
- **The dry physical process offers an eco-friendly and industrially scalable solution.**
- **Achieves over 80% recovery yield.**
- **Quinoa germ can be a valuable source of plant-based protein and is suitable for functional food product development.**
- **This breakthrough has the potential to revolutionize quinoa utilization in the food and pharmaceutical industries.**

SeaSlim: CSIR-CFTRI's Innovative Solution to Combat Obesity

CSIR-CFTRI (Central Food Technological Research Institute) has also developed an anti-obese food supplement called "SeaSlim" using brown seaweed *Padina tetrastromatica* and barley.

- **SeaSlim is rich in nutrients, antioxidants, dietary fibers, and hydrocolloids, making it a potent antioxidant food.**
- **It helps reduce fat absorption, lowers the risk of obesity and diabetes, aids digestion, and promotes food assimilation.**
- **SeaSlim regulates body weight, reduces food intake, and has a low glycemic index (Low GI-48), making it effective in managing obesity.**
- **The supplement is safe for consumption, has no added preservatives, colors, or artificial agents, and is suitable for obese and diabetic individuals.**

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Innovations and Contributions by CSIR labs

In this issue:

image credits: drugscontrol.org

CSIR-NIIST Nears Breakthrough in Early Cancer and Alzheimer's Detection

In an exciting new development, a multidisciplinary team of researchers at CSIR-National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram, are very close to perfecting the clinical validation of a diagnostic platform, which will enable the early detection of many cancers and Alzheimer's disease (AD) through a simple and affordable blood test.

- **The platform utilizes surface-enhanced Raman spectroscopy (SERS) and artificial intelligence (AI) to analyze blood samples.**
- **Raman spectroscopy is non-invasive, rapid, and sensitive to biomolecules, making it suitable for blood analysis.**
- **A start-up called Olusium is collaborating to enhance the AI algorithm for accurate analysis.**
- **The test is affordable and non-invasive, with results available in under half an hour.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

CSIR-AMPRI Develops Cost-Effective Raman Spectrometers

CSIR-AMPRI (Advanced Materials and Process Research Institute) in Bhopal develops high-end Raman Spectrometers in collaboration with a Jaipur-based company.

- **These indigenous Raman Spectrometers offer cost-effective alternatives to imported ones.**
- **They have a success rate of up to 80% compared to imported spectrometers.**
- **Institutions like CSIR-IICB (Indian Institute of Chemical Biology), MANIT-Bhopal, and IISER-Pune have already installed them.**
- **CSIR-AMPRI also repurposes toxic 'red mud' waste into lead-free X-ray shielding tiles, addressing environmental concerns.**
- **These tiles are up to 40% cheaper than existing lead-lined walls in X-ray centers and have garnered interest from both the government and private sector.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image source: nal.res.in

CSIR-NAL Unveils JALDOST to Combat Aquatic Weed

CSIR-National Aerospace Laboratories (CSIR-NAL), Bengaluru unveiled JALDOST, an airboat that removes aquatic weeds from lakes and rivers. An airboat is powered by an aircraft engine.

- **JALDOST is designed to tackle water pollution by removing excess weeds and floating waste, promoting a cleaner environment.**
- **The airboat features an unsinkable design with a closed airtight pontoon**
- **Utilizes a hybrid propulsion system.**
- **It can navigate through weeds efficiently and collect them using a steel mesh belt conveyor system.**
- **JALDOST is ideal for use in Bengaluru's 190 lakes and will help meet the civil body's requirements for weed removal.**

Image source: serc.res.in

Demonstration of Cost-Effective Toilet units by CSIR-SERC

CSIR–SERC (Structural Engineering Research Center) in Chennai has developed cost-effective and durable toilet units with thin precast concrete segmental panels.

- **These toilet units are designed for rapid installation and aim to improve sanitation in both rural and urban areas.**
- **The precast and lightweight components are corrosion-resistant, easy to transport, and can be assembled on-site in a few hours.**
- **The total cost of a user-end toilet unit is approximately Rs. 15,000, with potential for further cost reduction through mass production.**
- **The technology is modular and can be used for clusters of toilet units.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image source: newindianexpress.com

CSIR-IICT Patented Technology Powers Self-Sustaining Biogas Plant

Bowenpally biogas plant is a model of sustainability and innovation that uses CSIR-IICT (Indian Institute of Chemical Technology), Hyderabad patented technology to convert food waste into biogas and electricity.

- **The plant, executed by Ahuja Engineering Services (AES) in 2020, processes up to 12,000 kg of food waste daily.**
- **Food waste is shredded, ground, and converted into slurry before being processed in anaerobic digesters to generate biogas.**
- **The biogas powers the market's canteen, saving on waste transportation costs and providing electricity.**
- **The plant has processed over 10,000 tonnes of vegetable waste, saved 22 tonnes of LPG, and reduced greenhouse emissions by more than 4,000 tonnes of CO_2 equivalent.**

Image source:timesofindia.indiatimes.com

image source: livekindly.com

From Mango Pulp to Leather: CSIR-CLRI's Eco-Friendly Initiatives

- **The CSIR-CLRI (Central Leather Research Institute) scientists in Chennai have developed a vegan leather alternative from mango pulp.**
- **They're expanding the focus from leather products to biomedical solutions, including diabetic wound dressings and aortic valves.**
- **CLRI has historically supported the leather industry and is now using collagen, a byproduct of leather production, for medical applications.**
- **The institute is creating sustainable vegan leather products from sources like mango pulp and agricultural waste.**

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

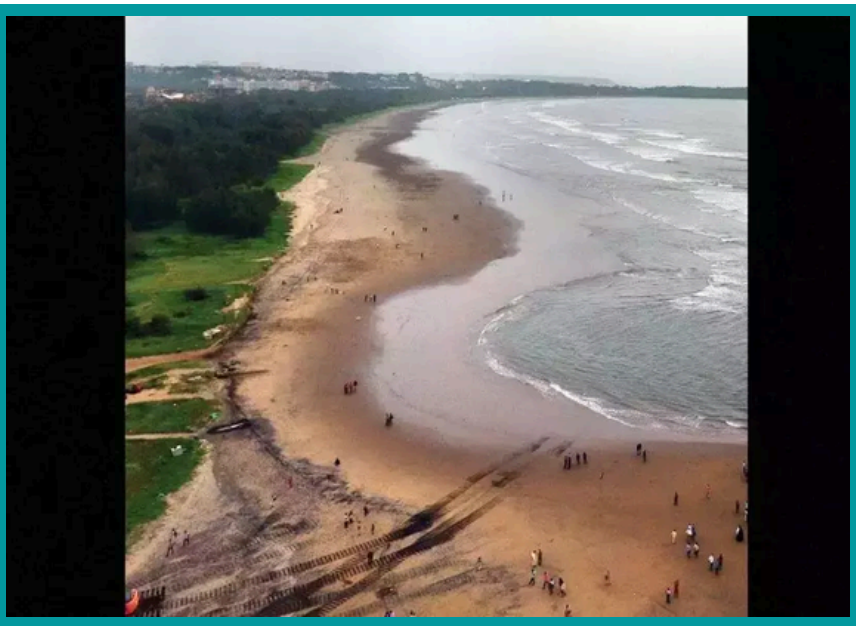

image source: Times of India

CSIR-NIO Backed Study Supports Goa's Efforts Against Beach Erosion

- Goa plans to use sand motor technology for beach nourishment and erosion control.
- The CSIR-National Institute of Oceanography (NIO) and National Centre for Coastal Research (NCCR) are providing technical support.
- Sand motor technology involves offshore sand extraction and deposition along the coast as a sea-level rise buffer.
- The Goa government initiated a study in collaboration with NIO under the World Bank-funded National Hydrology Project.
- Coastal areas like Keri, Majorda, Mobor, Betul, Betalbatim, Khanaginim, and Coco Beach face erosion challenges.
- Anti-erosion measures, including tetrapods and concrete blocks, have been implemented in specific beach areas.

Cipla and CSIR-CDRI Collaborate on Levormeloxifene: A Non-Hormonal Contraceptive

The CSIR-Central Drug Research Institute (CDRI) in Lucknow has introduced an innovative contraceptive named 'Levormeloxifene'.

Image source:https://www.csir.res.in

- Levormeloxifene is a modernised version of the 1990s 'Saheli' pill, initially developed by CSIR-CDRI.
- It offers enhanced effectiveness with reduced chemical content, benefiting women in their reproductive phase.
- The contraceptive focuses on the levo counterpart, minimizing exposure to unnecessary chemicals.
- A decade-long research effort led by CSIR scientists results in the breakthrough contraceptive.
- Cipla receives approval for Phase-I clinical trials of Levormeloxifene.
- It will complement existing family planning methods, including OCPs, condoms, and more.
- CSIR's Levormeloxifene poised to revolutionize contraceptive choices for women.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

image source: packagingconnections.com

CSIR-CSMCRI Innovates Biodegradable Seaweed Plastic Film for Packaging

Gujarat's CSIR-CSMCRI (Central Salt and Marine Chemicals Research Institute) develops biodegradable seaweed plastic film to replace harmful plastics.

- **Seaweed-based films offer biodegradable packaging for perishable food items.**
- **The film has antimicrobial properties, extending the shelf life of stored food.**
- **Seaweed-based packaging keeps food items at the desired temperature.**
- **Potential to replace multilayer plastic used in namkeen packaging.**
- **Scientists explore making cutlery items from solid seaweed film.**
- **CSIR-CSMCRI collaborates with the industry for cost-effective commercial production.**

<u>Salient Technical Features</u>

- **The specification of the film: Tensile Strength = 10-14 MPa; Moisture content = 8-10%.**
- **The films are stable at ambient condition for 1-2 years without any degradation and moisture accumulation**
- **These films are odourless and can be heat-sealed and pouches to store non-aqueous solvents can be prepared**
- **These films are suitable to store solid food items**
- **These films disintegrate in cold and hot water**
- **The films are completely biodegradable.**

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SCIENCE AND SOCIETY NEWSLETTER

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In this issue:

CSIR-NPL Scientists Achieve High-Purity Polysilicon from Recycled Solar Cells

Researchers at the Academy of Scientific and Innovative Research (AcSIR) and the CSIR-NPL (National Physical Laboratory), New Delhi, in India have used the SPS (spark plasma sintering) technique to produce polysilicon ingots from recycled solar cells in end-of-life PV modules.

- **Purity levels of 98% to 99% achieved with innovative SPS technique.**
- **Research aims to achieve over 5N purity for use in new solar cell fabrication.**
- **Modified SPS technology enables rapid heating and short processing times.**
- **Experiment conducted on a 98 cm × 164 cm solar module, yielding promising results.**
- **Successful removal rates of aluminum (97.72%) and silver (99.90%) reported.**
- **Potential applications extend beyond solar cells to include battery materials.**

image source: pv-magazine-india.com

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SCIENCE AND SOCIETY NEWSLETTER

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In this issue:

image source: heraldgoa.in

CSIR-NIO Collaborates on River Sal Revival Plan in Goa

The Water Resources Department with CSIR-NIO (National Institute of Oceanography) is implementing a phased plan to rejuvenate the polluted River Sal, involving desilting, aeration, and maintenance measures, along with efforts to improve water quality and safeguard biodiversity.

- **Water Resources Department initiates efforts to revive polluted River Sal.**
- **Comprehensive plan includes desilting, channel improvements, and water quality enhancement.**
- **Collaboration with River Rejuvenation Committee (RRC-Goa) for restoration action plan.**
- **Measures to safeguard biodiversity along riverbanks in progress.**
- **Investigation into sewage pollution from Sewage Treatment Plant (STP) underway.**
- **Online Continuous Effluent Monitoring System (OCEMS) installed at STP for water quality control.**
- **CSIR-NIO collaboration focuses on river biodiversity assessment.**

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In this issue:

Image 1. Mysore Slender Loris *Loris lydekkerianus* ssp. *lydekkerianus*.

Image 2. Malabar Slender Loris *Loris lydekkerianus* ssp. *malabaricus*.

Available from: Teja, Vinay & Manu, Shivakumara & Kumara, Honnavalli & Umapathy, Govindhaswamy. (2023). Phylogenetic Insights on the Delineation of Mysore and Malabar Subspecies of the Grey Slender Loris (Loris lydekkerianus) in Southern India. Journal of Threatened Taxa. 15. 10.11609/jott.8491.15.9.23827-23835.

CSIR-CCMB Study Identifies Mysore and Malabar Slender Lorises as Separate Species

Researchers from CSIR-CCMB (Centre for Cellular & Molecular Biology), Hyderabad, sequenced the genomes of Mysore Slender Loris and Malabar Slender Loris, concluding they are distinct species from the Grey Slender Loris.

- **The study, led by Dr G. Umapathy, found a genetic difference of about 2% between Mysore and Malabar Slender Lorises.**
- **Treating both lorises as separate species is crucial for conservation efforts.**
- **The Centre recently designated exclusive conservation reserves for the threatened Slender Loris, emphasizing the need for protection.**
- **Slender lorises, small nocturnal primates in India and Sri Lanka, were previously considered sub-species based on morphological variation but are now recognized as distinct species.**
- **Phylogenetic analysis reveals that Mysore and Malabar Slender Lorises form distinct clades, diverging about 1.049 million years ago.**
- **Due to genetic variation, evolutionary divergence, morphological differences, and distinct habits, researchers propose recognizing Mysore and Malabar Slender Lorises as two distinct species.**

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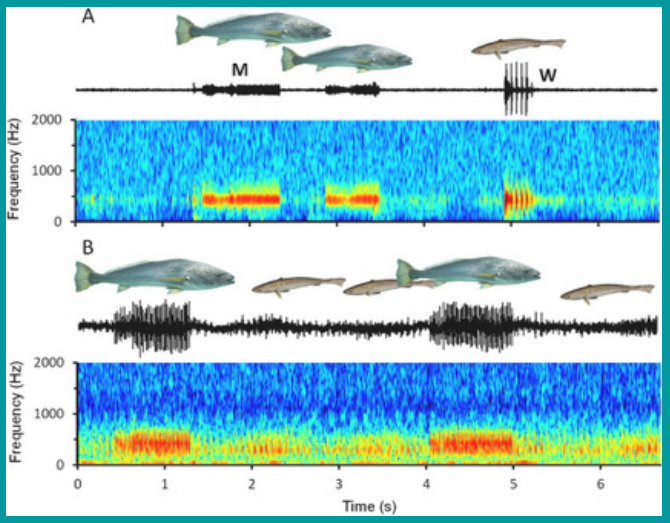

Available from: https://www.sciencedirect.com/science/article/pii/S0141113623001459

CSIR-NIO Scientists Harness AI to Identify Sound-Making Fish off Goa

CSIR-NIO (National Institute of Oceanography) scientists use AI to detect soniferous fish species off Goa coast, indicating good health of marine ecology.

- **The study identifies Terapon theraps, Sciaenidae, and Snapping Shrimp as sound-producing fish species.**
- **AI-based algorithms match recorded fish sounds, providing quick identification within minutes.**
- **Former Chief Scientist Bishwajit Chakraborty initiated the study using passive acoustic sensors.**
- **The research not only confirms fish species presence but also assesses the health of Goa's coastal reef system.**
- **Monitoring coral reef regions is crucial, and CSIR-NIO is at the forefront of such research in India.**
- **AI approach will help in identifying fish species through its sound by interpreting the collected data in real-time; worldwide, 989 fish species from 133 families and 33 orders can produce active sound**
- **The findings were published in the Journal of the Acoustical Society of America.**

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CSIR-NCL leads Pune Project to Expand Wastewater Surveillance to Track Influenza Viruses

The Pune Wastewater Surveillance project, led by the Pune Knowledge Cluster and funded by the Rockefeller Foundation, is expanding its monitoring efforts to include influenza-A viruses along with Covid-19.

- **Launched in August 2021, the project involves scientists from the CSIR-National Chemical Laboratory (NCL), Symbiosis School of Biological Sciences (SSBS), and the Indian Institute Science Education and Research (IISER) Pune.**
- **Wastewater samples from 32 sites in Pune have been analyzed to understand the viral load and presence of viruses in the population.**
- **Wastewater testing is less biased than clinical testing, representing the collective contribution of individuals in a specific catchment area.**
- **Provides valuable insights into disease prevalence.**
- **A user-friendly dashboard presents information on viral loads of Covid-19 and influenza-A viruses found in wastewater.**
- **Project acknowledges the need to correlate data with clinical cases for more concrete conclusions about disease prevalence.**
- **Expanding surveillance to include influenza viruses enhances Pune's ability to detect and respond to infectious diseases, utilizing wastewater as a proactive tool for community health.**

Smart Grids for Cleaner NCR Air: CSIR-NEERI's Approach

Nagpur based CSIR-NEERI (National Environmental Engineering Research Institute) scientists are developing a grid-based strategy, Local Area Management Plan (LAMP), to monitor and address air pollution across the National Capital Region (NCR)

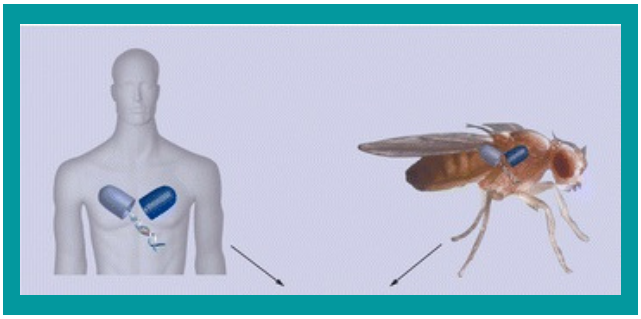
- **LAMP tailors measures for specific areas, avoiding generic solutions.**
- **Wazirpur study highlights PM2.5 spikes from road dust and industries.**
- **LAMP recommends targeted actions based on pollution sources.**
- **LAMP offers a focused, grid-wise approach for effective urban air pollution control.**

Future of Food: CSIR-NIIST's 3D-Printed Fish with Omega-3 Fatty Acids

CSIR-NIIST (National Institute for Interdisciplinary Science and Technology) in Thiruvananthapuram pioneers 3D-printed food with custom nutrient profiles.

- Edible inks derived from natural sources allow customization of salt, sugar, fats, carbs, and proteins.
- The institute has developed inks from rice starch, millet carbs, egg proteins, and chocolate.
- The team's highlight is vegan mock meat, replicating flavors and textures of meat and fish.
- 3D-printed fish designed for nutrient density, containing high levels of Omega-3 fatty acids.

Image credits: indianexpress.com



CSIR-CCMB's Fruit Fly Research Offers Hope for Microcephaly

Hyderabad's CSIR-CCMB (Centre for Cellular and Molecular Biology) researchers use genetically mutated fruit flies to study microcephaly, a lethal brain development disorder in humans.

- The fruit fly's molecular similarities to the human brain make it an ideal model for researching potential therapeutics for microcephaly.
- Microcephaly results from underdeveloped brains during pregnancy, leading to life-long challenges in physical and mental abilities for affected infants.
- CCMB scientists focus on genes causing small brains in fruit flies, as these genes and their mutations are also present in humans, contributing to microcephaly.
- Fruit flies with small brains serve as a model system to test potential drugs for treating brain-related diseases, offering insights into human brain development and behavior.

CSIR-NEERI to Convert Floral Waste into Incense Sticks

Nagpur based CSIR-NEERI (National Environmental Engineering Research Institute) scientists and Nagpur Municipal Corporation (NMC) are developing plans to convert floral waste into incense sticks (agarbatti).

- NEERI proposes scientific disposal of floral waste from Netaji Market
- CSIR-CIMAP to help NMC set up incense stick manufacturing plant
- NMC to lease out 4,500 sq ft land in Netaji flower market for 24 months
- Small scale industries in Nagpur already making incense sticks from flower waste

Presented by:

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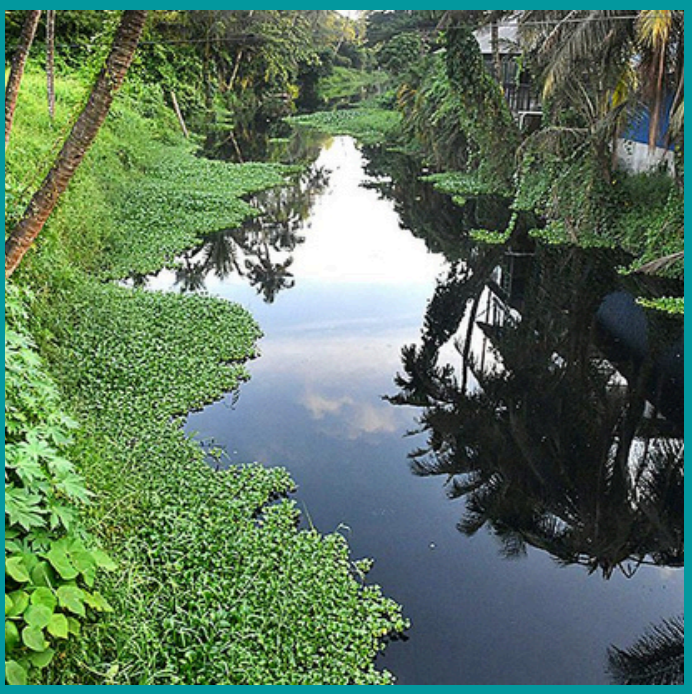


Credit: THG Publishing Private Limited

CSIR-NEERI and Kerala PCB Unite Against Water Pollution

The Kerala State Pollution Control Board (PCB) has approved a project by the CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) to develop a process package treatment method to prevent sewage pollution of water bodies.

- **CSIR-NEERI to develop a method to prevent sewage pollution.**
- **Project targets Pallikkalar stretch and Edappally, Perandoor canals.**
- **NGT directed authorities to prevent pollution from untreated wastewater.**
- **CSIR-NEERI scientists to submit feasibility report in 15 months.**
- **Treatment method involves physical, chemical, and biological processes.**
- **PCB prioritized this proposal due to a pending tribunal case.**
- **Kerala government asked to implement temporary measures.**

GNIDA and CSIR-CRRI Collaborate for Durable Roads

The Greater Noida Industrial Development Authority (GNIDA) has decided to use durable and eco-friendly paver block technology, suggested by the CSIR-Central Road Research Institute (CSIR-CRRI), for road construction to enhance road quality and lifespan.

- **Paver blocks are durable and eco-friendly.**
- **CRRI participated and suggested plastic-mixed paver technology.**
- **Paver blocks result in stronger, damage-resistant roads.**
- **Technology to be used for internal roads as well.**
- **Tenders will be issued for road construction using this technology.**

Image credits: www.nbmcw.com

CSIR-CDRI and Sravathi: A Strategic Collaboration for AI in Cancer Treatment

The CSIR-Central Drug Research Institute (CSIR-CDRI) is collaborating with Bengaluru-based startup Sravathi AI Technology Pvt Ltd to use artificial intelligence (AI) in developing new therapeutics for cancer treatment.

- They will use the startup's AI and computational tools.
- The goal is to create anti-cancer novel chemical entities (NCEs).
- AI can efficiently identify anti-cancer properties of compounds.
- The startup believes AI can identify effective, safe compounds quickly and cheaply.
- The collaboration will advance CSIR's pan-cancer mission programme.
- CSIR-CDRI has developed 13 drugs and transferred 80+ process technologies to pharma companies.

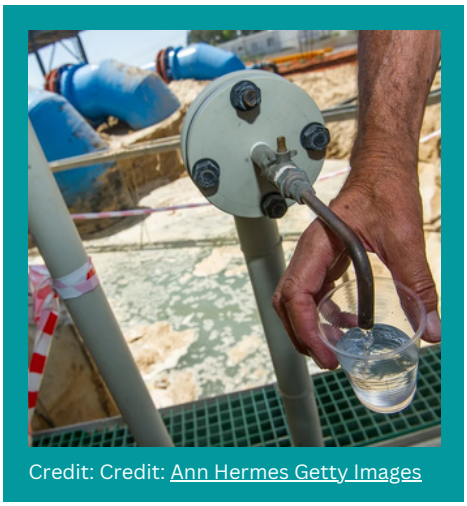
Image credits: YOUTUBE/POWERFULJRE

CSIR-CIMAP's Ray of Hope for Smokers: Low-Nicotine Tobacco Plant

The CSIR-Central Drug Research Institute (CSIR-CDRI) is collaborating with a startup to develop a low-nicotine tobacco plant using genetic science, which could potentially reduce health risks for smokers, but will not make smoking safe.

- Genetic science may have developed a tobacco plant with 60-70% less nicotine.
- CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) has lowered nicotine content in the Petit Havana Tobacco plant by 40-50%.
- The institute discovered a biosynthetic pathway for nicotine in the tobacco plant root, which can be regulated or blocked to alter nicotine levels.
- 7% of all deaths in India are attributable to tobacco, according to WHO.
- Tobacco smoke causes over 27% of all cancers and 90% of all oral cancers in India.
- The government asks companies to use 85% of cigarette pack space for health warnings.
- Lowered nicotine content might reduce health risks, but will not make smoking safe.

CSIR-CSMCRI's Dual Benefit Technology: Zero-Liquid Discharge and Salt Recovery



Credit: Credit: Ann Hermes Getty Images

Scientists at the CSIR-Central Salt Marine and Chemicals Research Institute (CSMCRI) have developed a new membrane technology that ensures zero-liquid discharge from purifiers, saving water and yielding non-edible salt.

- CSMCRI scientists have developed a new membrane technology for purifiers.
- The technology ensures zero-liquid discharge, saving large quantities of water.
- The technology also recovers non-edible salt, which has various industrial uses.
- The new membrane selectively separates water and salt from the source.
- The technology will be particularly helpful in coastal areas with high salinity.
- High TDS water is converted into pure potable water and non-edible salt.
- The technology is seen as a potential game-changer in water management.

CSIR-NEERI's Noise Tracker App: A Step Towards Noise Control

Image credits: vigyanprasar.gov.in

CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) has developed a Noise Tracker app, with the support of social organization 'JanAkrosh', to monitor and control noise levels in Nagpur City.

- Measures real-time noise levels in Nagpur City.
- The app is supported by social organization 'JanAkrosh'.
- 'JanAkrosh' will deploy volunteers for noise monitoring in the city.
- The data from the app will help identify noise hotspots and implement control measures.
- The noise data will enable regulatory authorities to take measures for noise abatement.
- 'JanAkrosh' plans to deploy volunteers in other cities for noise monitoring using the app.

From Fruits to Leather: CSIR-CLRI's Innovative Approach


Image credits: citytimes.co.in

The CSIR-Central Leather Research Institute (CLRI) in India is developing eco-friendly leather alternatives from mango, wheat, rice, and sugarcane, aiming to reduce dependence on synthetic leather and its environmental impact.

- Only two countries, the Netherlands and Mexico, are currently producing similar products.
- Leather products crafted from wheat, rice, sugarcane straw, and mango pulp are expected to hit the market soon.
- The global shift towards eco-friendly materials is driving this initiative.
- Synthetic leather, a non-biodegradable material, poses significant environmental challenges.
- CLRI's initiative aligns with efforts in Western countries to find sustainable alternatives to synthetic leather.
- The environmentally-friendly leather options developed by CLRI are expected to decompose within 50 years.

Revolutionizing Fighter Jets: CSIR-NAL and ADA's Development of Flaperon Assembly

- The Aeronautical Development Agency (ADA) and CSIR-NAL have developed a Flaperon Structural Assembly for the Advanced Medium Combat Aircraft (AMCA) program.
- The project utilized advanced carbon composites, promising a lighter and more efficient fighter jet.
- The flaperon assembly incorporates co-cured technology, revolutionizing composite fabrication.
- The first prototype rollout of the AMCA is expected soon, with full-fledged production operations slated to start in 2029.
- The AMCA project highlights India's 'Atma Nirbhar' initiative in pursuit of self-reliance in aerospace technology.

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Image Source: SHUTTERSTOCK

CSIR-NBRI Transfers Herbal Curcumin Technology

On its 70th Annual Day, the CSIR-National Botanical Research Institute (CSIR-NBRI) transferred the technology for Croma-3, a curcumin capsule, to Hyderabad-based M/s Xavier Med Pvt. Ltd., marking the second such transfer to enhance market availability.

- **CSIR-NBRI transferred the technology for Croma-3 to M/s Xavier Med Pvt. Ltd.**
- **This is the second transfer of the technology.**
- **The transfer was part of the 70th Annual Day celebration of CSIR-NBRI.**
- **Croma-3 contains more than 10% curcumin, which boosts the immune system.**
- **The formulation follows the guidelines issued by the Ministry of AYUSH.**
- **Dr. AK Singh emphasized the need for farmers to diversify their crops.**
- **VK Mishra highlighted the importance of increasing farmers' income and improving soil nutrients.**

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Image credits: pangoogroup.com

CSIR-NIO's Probiotic Boosts CUSAT's Start-Up for Sustainable Aquaculture

Cochin University of Science and Technology (CUSAT) has launched its first faculty-driven start-up, MSorita LLP, which uses a CSIR-National Institute of Oceanography (NIO)-designed probiotic for organic waste management and disease control in aquaculture, aiming to increase farming income and provide scientific services to farmers.

- **This venture aims at organic waste management and disease control in aquaculture farms and backwater ponds.**
- **The probiotic, designed by the CSIR-National Institute of Oceanography in Goa, was field tested in Gujarat, Karnataka, and Kerala, that reported in increased income from fish farming ecosystems.**
- **The start-up will initiate research and develop better and affordable products for aquaculture farming industries.**
- **It will also offer scientific services to assist aquaculture farmers.**

Assessing Biodiversity with eDNA: A Breakthrough by CSIR-CCMB

Researchers at the CSIR-Centre for Cellular and Molecular Biology (CCMB) in Hyderabad have developed a new, non-invasive method to assess total biodiversity in an ecosystem using environmental DNA (eDNA).

- **The method can detect all types of organisms from a water sample.**
- **It overcomes limitations of traditional methods which are expensive and time-consuming.**
- **The method was successfully tested in Chilika Lagoon in Odisha.**
- **This new method is cheaper, faster, and scalable to large ecosystems.**

Image credits: newsmeter.in

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Image source: indiatvnews.com

CSIR-NEERI Study Guides KMC's Anti-Pollution Measures

The Kolkata Municipal Corporation (KMC) is implementing CSIR-NEERI (National Environmental Engineering Research Institute)'s several anti-pollution measures, including the use of water sprinklers and road-washing machines, to combat air pollution in the city.

- **KMC has adopted anti-pollution measures to keep pollution levels at bay across its 144 wards.**
- **Road dust resuspension is a major source of air pollution in Kolkata, as per a study by CSIR-NEERI.**
- **KMC has procured road-washing machines fitted with water sprinklers to wash streets and trees.**
- **The civic body will monitor the burning of dry tree leaves at night and water areas where garbage burning produces toxic fumes.**
- **WBPCB (West Bengal Pollution Control Board) has taken measures to contain air pollution, including providing LPG (Liquefied petroleum gas) connections to roadside eateries and laundry units.**

CSIR Partners with UP Government for Solar-Powered Drug Park

The Yogi government in Uttar Pradesh is harnessing solar energy for its Bulk Drug Park in Lalitpur and collaborating with CSIR-affiliated laboratories to focus on herbal medicine research and production.

- **The Yogi government is focusing on reducing carbon emissions by using solar energy in its projects.**
- **The Bulk Drug Park in Lalitpur will exclusively use clean energy vehicles.**
- **A unit of herbal medicines will be set up in the Bulk Drug Park.**
- **The Yogi government has signed MoUs with 43 CSIR-affiliated laboratories for research and cost-effective medicine production.**
- **An herbal park dedicated to the production of herbal medicines will be developed within the Bulk Drug Park.**

Image source: indianhealthyrecipes.com

CSIR-CFTRI Develops Instant Beverage Mix from Malted Ragi

CSIR-CFTRI (Central Food Technological Research Institute), Mysuru, developed a protein-rich, calcium-packed instant beverage mix from malted ragi that doesn't sediment, offering a unique and healthy drink option.

- **CSIR-CFTRI creates non-sedimenting instant beverage mix using malted ragi.**
- **Mix contains 30% malted ragi flour and lower barley malt extract than market options.**
- **Rich in protein (13g/100g) and calcium (3,590mg/100g) with 362 kcal energy.**
- **Natural source of calcium without fortification, can be further fortified if needed.**
- **Offered in various flavors to target different segments.**

Presented by:

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In this issue:

Image source: Hindustan Times

Arabian Sea Salinity Disrupted: CSIR-NEERI Alarms Mumbai's Untreated Sewage

Partially treated sewage from Mumbai discharges in toxic plumes, lowering sea water salinity and threatening marine ecosystems, a CSIR-NEERI (National Environmental Engineering Research Institute), Nagpur, study warns.

- **Untreated sewage from Bandra and Worli outfalls form toxic plumes in Arabian Sea.**
- **Sea surface salinity lowered to 30-34 PSU, disrupting marine life.**
- **Bandra and Worli are the only west coast outfalls discharging partially treated sewage.**
- **Plumes pose risk to tourists and fishermen in the recreational and fishing hub.**
- **CSIR-NEERI calls for immediate measures to collect, treat, and recycle sewage.**

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CSIR-NBRI Leads the Way: Halberd Fern Gene Protects Crops from Whiteflies

In lab tests, corn earworms usually devour maize leaf samples (right), but one carrying a newly identified fern protein was protected. Source: Cortiva Agriscience

CSIR – National Botanical Research Institute (NBRI), Lucknow, researchers identified new fern proteins that kill pests and could become a safer alternative to chemical insecticides.

- **Fern proteins have shown promise in killing pests, including those resistant to Bt (*Bacillus thuringensis*) insecticides.**
- **The Cretan brake fern is a source of a newly discovered insecticidal protein family called IPD113.**
- **Fern proteins may work differently than Bt proteins, potentially making them resistant to evolving pest defenses.**
- **Researchers are also exploring insecticidal compounds from other ancient plants like liverworts and mushrooms.**
- **The new discoveries offer hope for a safer and more sustainable future of pest control.**

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In this issue:

Image Source: Ritesh Vijay, Ph. D. linkedin.com

CSIR-NEERI Offers Dual Approach to Sewage: UCCW for Cities, HIM-STP for Himalayas

CSIR-NEERI (National Environmental Engineering Research Institute), Nagpur, developed low-cost wastewater treatment technologies to reduce sewage load and water shortage: UCCW (Upflow Compact Constructed Wetland) for cities and HIM-STP for high-altitude areas.

- **UCCW treats 1,000-3,000 liters of sewage in 24 hours with bacteria and methaneogens.**
- **Recycled water can be used for non-drinking purposes, reducing pressure on water systems.**
- **HIM-STP is suitable for Himalayas and military camps at high altitudes.**
- **CSIR-NEERI commissioned UCCW on its campus in 2022 and plans to scale it up.**
- **CSIR-IHBT highlights difficulty of sewage treatment in the Himalayas during winter.**

CSIR Backs BITS Goa Research: Scrap Tires Turned into Water Purification Hope

BITS (Birla Institute of Technology and Science), Pilani – Goa Campus Professor's CSIR-funded research aims to use recycled carbon black from scrap tires to make membranes for water desalination and purification.

- **Over a million tons of scrap tires in India pose environmental threats.**
- **BITS Goa study proposes recycling scrap tires for water purification membranes.**
- **Modified carbon black from tires to be used in membrane fabrication.**
- **CSIR grant of Rs 27 lakh funds the project for three years.**
- **Research focuses on characterization, synthesis, and pilot testing of membranes.**

Presented by:

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In this issue:

Image source: starofmysore.com

Millet Mania: CSIR-CFTRI's Recipe Book Aims to Boost Consumption of Nutritious Grains

The CSIR-Central Food Technological Research Institute (CFTRI), Mysuru, is preparing to come out with a compendium on millet recipes collecting recipes used by the people in various regions of the country for popularising consumption of millets.

- **Aims to increase millet consumption and highlight health benefits.**
- **Analyzing 100 millet varieties for nutritional value.**
- **Developed 15+ millet technologies, including ragi ball machine.**
- **Studying shelf life, tribal recipes, and waste usage for biodegradable items.**
- **Clinical trials planned to further analyze health aspects.**
- **Project supported by 9 other CSIR labs, emphasizing national effort.**

Image source: starofmysore.com

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In this issue:

Image source: The Hindu

Pedal to the Millet: CSIR-CFTRI's Manual Mill Champions Rural Processing

The CSIR-Central Food Technological Research Institute (CFTRI), Mysuru designed simple, effective machinery for milling and processing millets, including a pedal-operated mill for small-scale use.

- **Mill praised for innovation and energy efficiency showcased at IFCoN (International Food Convention)-2023.**
- **Other machines include roasters, formers, and mills for various millet products.**
- **Non-availability of small mills led to development of pedal mill for rural areas.**
- **Technologies developed under DSIR funding for small and medium enterprises.**

Cannabis & Boswellia Lead the Way: CSIR Partnership Unlocks Phytopharmaceutical Potential

CSIR-DBT-ICMR Council of Scientific & Industrial Research (CSIR), Department of Biotechnology (DBT) and Indian Council of Medical Research (ICMR) collaboration's two phytopharmaceutical leads for pain and arthritis are in advanced development stages.

- **Cannabis Sativa and Boswellia Serrata leads for pain and arthritis, respectively.**
- **Joint effort by CSIR, DBT, and ICMR with defined roles for each agency.**
- **One successful IND (Investigational New Drugs) filing from Phase I of CSIR Phytopharmaceutical Mission.**
- **Three more leads from Phase II ready for IND filing.**

Image source: planetayurveda.com, DANIEL ZGOMBIC

Presented by:

Extract from 'CSIR Matters'

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Image source: flowersnemotions.com

From Flower to Perfume: CSIR-NBRI's Parijat Lab

Lucknow's National Botanical Research Institute (NBRI), a CSIR lab, has opened the Parijat Lab for the research and development of natural ingredient-based perfumes, using flowers grown by local farmers.

- **The lab will use flowers grown by local farmers to produce perfumes.**
- **This initiative aims to promote the production of indigenous perfumes in India.**
- **The technology developed will be shared with interested private players.**
- **The initiative aligns with the "vocal for local" movement, aiming to produce completely desi perfumes.**

CSIR-CCMB's Groundbreaking Study on Hangul Deer Population

Researchers from the CSIR-Centre for Cellular and Molecular Biology (CCMB) have used genetic data to estimate the population of the critically endangered Hangul deer in Kashmir.

- **Hangul deer is critically endangered and faces imminent threat of population loss and extinction.**
- **The study identified 293 individuals through faecal analysis using 14 microsatellite markers.**
- **The estimated Hangul population using genetic mark-recapture with bootstrapping was 394 individuals.**
- **The study will guide future research and help identify founder animals for captive breeding to ensure the deer's long-term survival.**

Image source: wikimedia.org

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Extract from 'CSIR Matters'

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image source: timesofindia.com

CSIR-CCMB Leads the Way in Predicting Pandemics

Researchers from the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad have developed a wastewater surveillance system that can predict the onset of a pandemic or a surge of infections two weeks in advance.

- **The system was first tested in Hyderabad during the first Covid wave and is now implemented in Prayagraj, Uttar Pradesh.**
- **Wastewater surveillance involves monitoring wastewater to detect the presence and concentration of disease-causing pathogens in communities.**
- **The system can detect various pathogens including SARS-CoV-2, polio virus, adenoviruses, hepatitis A and E viruses, rotaviruses, bacteria and parasites.**
- **The researchers are exploring the possibility of using this system for disease monitoring in large events like the upcoming Kumbh Mela 2025.**

Addressing Malnutrition: The CSIR-NIIST Approach with Fortified Rice

Researchers from the CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) have highlighted the importance of Fortified Rice Kernels (FRKs) in addressing malnutrition and anaemia in India.

- **The Government of India has allocated a budget for the distribution of fortified rice through the public distribution system.**
- **There are currently 18,227 rice mills in India equipped with rice-nutrient blending infrastructure for producing fortified rice.**
- **CSIR-NIIST plans to produce its own FRKs, highlighting the potential of grain fortification to reduce anaemia and improve iron and vitamin levels.**

Image source: medium.com

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SCIENCE AND SOCIETY NEWSLETTER

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In this issue:

Image source: oliveridleyproject.org

Assessing Noise Impact on Turtles: A CSIR-CRRI Study

The Central Road Research Institute (CRRI) is initiating a first-of-its-kind study to measure sound levels on protected turtle nesting beaches to understand the impact of noise pollution on turtle nesting and hatching success.

- **CRRI will measure sound levels on four protected turtle nesting beaches as part of a study on the effects of noise pollution on turtle nesting and hatching.**
- **The study will provide scientific evidence and recommendations for controlling and reducing noise pollution in coastal areas.**
- **Noise can disrupt the habitat of sea turtles and affect their natural behaviour, including communication, navigation, and orientation.**
- **The study will use various tools and techniques, such as sound level meters, noise mapping software, GIS, and statistical analysis.**
- **The Goa Coastal Zone Management Authority has previously taken measures to safeguard turtle nesting sites by declaring them silence zones.**

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Image source: timesofindia.com

CSIR-IITR's Study on Heavy Metal Contamination in the Ganga River

A joint research team from Banaras Hindu University, CSIR-Indian Institute of Toxicology Research (CSIR-IITR), and the Academy of Scientific and Innovative Research (AcSIR) has found that the presence of heavy metals in the Ganga river in Varanasi is posing a risk to human health and life.

- **Researchers measured heavy metals in river water and aquatic life, including fish.**
- **Lead, manganese, chromium, and cadmium concentrations in Ganga water exceeded EPA's safe limits.**
- **Consuming contaminated fish could lead to bioaccumulation of heavy metals in humans.**
- **The study highlights the need for regular assessments to manage contamination and raise awareness.**

A Fragrant Surprise: CSIR-NBRI Cultivates Tulips in Winter

Scientists from the CSIR-National Botanical Research Institute (CSIR-NBRI) in Lucknow have successfully cultivated tulips in winter, a first-of-its-kind achievement that could lead to the development of new tulip varieties better suited to the Indian climate.

- **They cultivated 60 tulips at the NBRI Banthra Research Center near Lucknow.**
- **The tulip acclimatization journey began in October on clay soil in Banthra.**
- **This successful cultivation could lead to new tulip varieties for the Indian climate.**
- **It could also create opportunities for farmers to grow and sell these tulips.**

Image source: localguidesconnect.com

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Image Source: indiatoday.in

CSIR-CRRI's REJUPAVE Technology Used for Building High-Altitude Roads in Arunachal

The state of Arunachal Pradesh has used the REJUPAVE technology developed by CSIR-CRRI to construct high-altitude roads during cold weather. Building at strategic sites like the Sela Road Tunnel and LDY Road close to the China border is made easier by REJUPAVE, which was implemented by the Border Road Organization (BRO) as part of Project VARTAK. BRO extends the operating window by achieving considerable decreases in production temperatures under the guidance of CSIR-CRRI.

The benefits of this technology includes:

- Enables construction of high-altitude bituminous roads in low and sub-zero temperatures.
- Extends the working window for construction companies by reducing production and rolling temperatures.
- Ensures minimal heat loss during transit, maintaining the quality of the bituminous mix.
- Contributes to environmental sustainability by lowering greenhouse gas emissions.
- Enhances road durability and resistance to thermal cracking in cold climates.
- Offers commercial viability and scalability for widespread adoption across India.

CSIR Developing Indigenous Medical Standards for India

CSIR launches PI-CHeCK project to develop indigenous medical standards for India, diverging from Western models. Led by 37 CSIR labs, including IMTECH, the project aims to address the unique genetic, environmental, and lifestyle factors of the Indian population.

Benefits:

- Diverse sampling across India facilitated by CSIR's nationwide presence.
- Western medical parameters may not suit Indian population due to biological and environmental factors.
- Testing includes blood biochemistry, ECG, microbiome analysis, lung function tests, and more.
- 5000 participants for deep phenotyping and 500 for very deep phenotyping out of the sample base.

Image Source: tribuneindia.com

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"CSIR-NIIST Collaborates with Kerala Youth to Introduce Novel Device Ensuring Clean Water in Hinterland"

"Adarsh P Kumar, 26, launches Hydronest startup for rural water purification. Solar-powered device developed with CSIR-NIIST, KWA support. Pilot project in Kerala's Alappuzha district targets areas with water scarcity. Expansion planned to Palakkad and eastern states. Technology removes arsenic, excess iron, pathogens. Aim to provide safe drinking water to rural India."

Important Features of Project

- **Discussions ongoing with panchayat and KWA officials; KWA expresses support.**
- **Expansion planned to Palakkad and eastern states including West Bengal, Assam, and Odisha.**
- **Technology capable of purifying water contaminated with arsenic, excess iron, and pathogens.**
- **Device also supplies clean water to hydrogen valleys as per Department of Science and Technology's definition.**
- **Aim to provide arsenic and pathogen-free drinking water to rural India.**

Image Source: newindianexpress.com

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CSIR-CRRI's Steel Slag Road Technology Revolutionizes National Highways

Dr. V.K. Saraswat, Member (S&T) of NITI Aayog, inaugurated India's First National Highway Steel Slag Road on NH-66 Mumbai-Goa. Developed by CSIR-Central Road Research Institute (CSIR-CRRI), this innovative technology transforms steel industry waste into wealth, aiding NHAI in constructing stronger and eco-friendly national highways. JSW Steel, guided by CSIR-CRRI, built a 1 km four-lane steel slag road section on NH-66, using 80,000 tons of processed CONARC Steel slag aggregates. These superior aggregates, surpassing natural ones in mechanical properties, were used in both bituminous and cement concrete road sections. Shri G S Rathore of JSW Steel praised CSIR-CRRI's efforts.

Image Source: crridom.gov.in

Benifits of Project

- Bituminous and cement concrete sections built with processed steel slag aggregates, offering superior mechanical properties.
- Shri G S Rathore of JSW Steel acknowledges CSIR-CRRI's efforts and NHAI's support.
- CSIR-CRRI developing national guidelines for steel slag road construction, collaborating with steel industries across India.
- NHAI praises the exceptional performance and cost-effectiveness of the steel slag road section on NH-66.
- Shri Satish Pandey of CSIR-CRRI highlights 28% thickness reduction and 32% cost savings compared to conventional roads, with enhanced durability.

सीएसआईआर-आईएचबीटी: हिमाचल में चॉकलेट ने स्वाद के साथ कुपोषण को भी दूर किया

सीएसआईआर-आईएचबीटी ने हिमाचल प्रदेश में बच्चों के कुपोषण को कम करने के लिए चॉकलेट के बारे में अद्भुत अनुसंधान किया है। ये चॉकलेट बार 2 से 5 साल के बच्चों को खिलाने के लिए हैं, और उनमें प्रोटीन, विटामिन, आयरन, फाइबर और कार्बोहाइड्रेट्स की अच्छी मात्रा होती है। ये चॉकलेट बच्चों को स्वस्थ और मजबूत बनाने में मदद करते हैं।

इस प्रोजेक्ट के तहत, छह प्रकार के चॉकलेट बार तैयार किए गए हैं, जो कि बच्चों को विभिन्न पोषक तत्व प्रदान करेंगे। इन चॉकलेट बार को जिला कांगड़ा में आंगनवाड़ी केंद्रों में बांटा जाएगा। फिर, यह प्रोजेक्ट प्रदेशभर में लागू किया जाएगा। इसके साथ ही, प्रोजेक्ट के अंतर्गत कांगड़ा जिले में पायलट प्रोजेक्ट की शुरुआत की जा रही है।

इसके बाद, यह प्रोजेक्ट और भी जगहों में लागू किया जाएगा। इस से उन बच्चों की मदद होगी जो कुपोषण से पीड़ित हैं और सही पोषण की कमी से ग्रस्त हैं।

Image Source: amarujala.com

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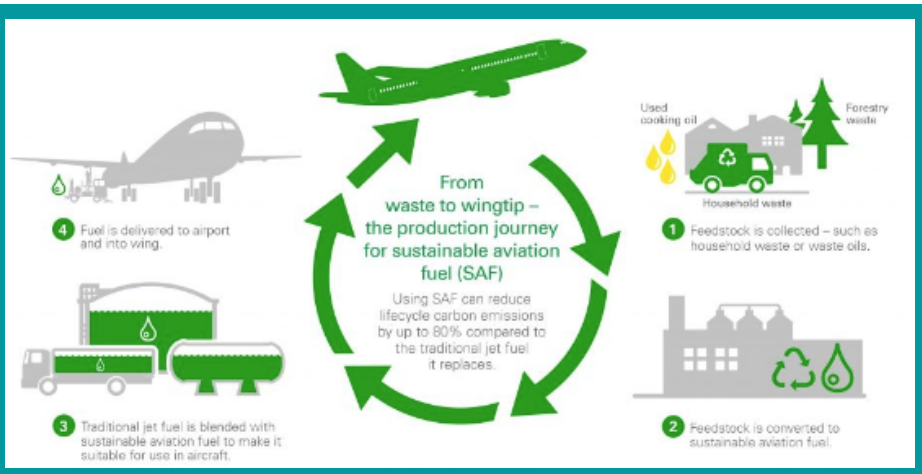

Image Source: civilsdaily.com

Airbus and CSIR-IIP Join Hands for Green Aviation in India

In a significant move, Airbus and CSIR-Indian Institute of Petroleum (CSIR-IIP) have signed an agreement to develop and test sustainable aviation fuel (SAF) in India. This collaboration aims to support India's aerospace industry in reducing carbon emissions by producing and commercializing SAF using innovative technology and locally sourced materials. Together, they will assess technical aspects, gain approvals, ensure market access, and work on sustainability accreditation for SAF production. Airbus is committed to flying its aircraft with up to 100% SAF by 2030, with all models currently certified for 50% SAF blend.

CSIR-NIIST Achieves Record Efficiency in Indoor Light Harvesting

Scientists at CSIR-National Institute for Interdisciplinary Science & Technology (CSIR-NIIST) have achieved a groundbreaking milestone by setting a new efficiency record of 35.6% indoor light harvesting using dye-sensitized solar cells (DSCs). This technology offers a sustainable alternative to disposable primary batteries, reducing environmental pollution.

Key Points:

- DSCs integrated into IoT systems, creating self-powered devices and reducing battery waste

- Semi-transparent DSCs allow integration into glass facades, greenhouses, enhancing indoor photovoltaic tech

- Team led by Suraj Soman uses eco-friendly copper electrolyte, boosting commercialization

- Narayanan Unni highlights greener future with indoor light harvesting, reducing primary battery use

- CSIR-NIIST developing self-powered prototypes to cut reliance on batteries, address climate change

Image Source: economictimes.indiatimes.com

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Image Source: deccanherald.com

CSIR Launches Smart Farming Initiative to Boost Farmer Income

The CSIR has started a new project to develop smart agricultural technologies specifically for paddy fields in southern India, aiming to improve soil quality and productivity to increase farmers' earnings. The initiative involves using advanced tools like sensors, drones, and Artificial Intelligence to gather real-time data on soil and crop health. Scientists from various CSIR institutes are working together to implement these technologies in selected areas in Kerala, Tamil Nadu, and Karnataka. The project will focus on optimizing agricultural practices such as irrigation and fertilizer application to enhance crop yields sustainably while minimizing environmental impact. Initially targeting paddy fields, the project plans to extend these technologies to other crops like saffron, apple, and mint. By leveraging technology and scientific expertise, CSIR aims to revolutionize farming practices and improve the livelihoods of farmers across India.

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Image Source: timesofindia.indiatimes.com

CSIR-CDRI-Led Study: Altering Cell Metabolism Shows Promise in Preventing Liver Cancer

A recent study by scientists from CSIR-Central Drug Research Institute (CSIR-CDRI), Central Institute of Medicinal and Aromatic Plants (CIMAP), and Centre of Biomedical Research (CBMR) in Lucknow reveals that altering cell metabolism could be a key to preventing liver cancer. Led by CDRI scientist Madhav Nilakanth Mugale, the research suggests that cancer cells change their metabolic programming, which could serve as a diagnostic tool for early cancer prevention.

Benefits of the CSIR-CDRI-Led Liver Cancer Research Project:

- **Offers potential diagnostic markers for early detection of liver cancer.**
- **Suggests a novel approach to prevent liver cancer by targeting cell Demonstrates the effectiveness of collaboration between CSIR-CDRI, CIMAP, and CBMR in conducting impactful research.**
- **Provides crucial insights into the metabolic mechanisms underlying Hepatocellular Carcinoma (HCC).**
- **Utilizes advanced techniques like Immunohistochemistry (IHC) and Nuclear Magnetic Resonance (NMR) for analysis.**
- **Conducts studies on an animal model to mirror human disease development, facilitating translational research.**
- **Raises hope for more effective interventions in combating liver cancer.**
- **Identifies metabolic changes as potential early indicators of liver cancer, aiding in timely treatment.**
- **Contributes to scientific advancement in understanding and addressing liver cancer.**

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Image Source: timesofindia.indiatimes.com

CSIR-CIMAP Launches Farmer-Friendly Innovations at Kisan Mela

CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) launched a farmer-friendly CSIR-Aroma android mobile app, 'Aloe Roma' gel for skincare, and a souvenir 'Aus Gyana' at the annual Kisan Mela. The app helps farmers get expert advice on crop issues. 'Aloe Roma' is a pure aloe vera gel with essential oils for skincare, and 'Aus Gyana' is a book featuring 164 medicinal and aromatic plants. During the event, 4,000 farmers from 25 districts of Uttar Pradesh and 15 states participated. They received over 250 quintals of high-yielding menthol mint seeds. Additionally, 500 women from various self-help groups demonstrated agarbatti making from flower waste. The event also saw participation from over 20 herbal industry representatives and entrepreneurs who interacted with farmers and scientists.

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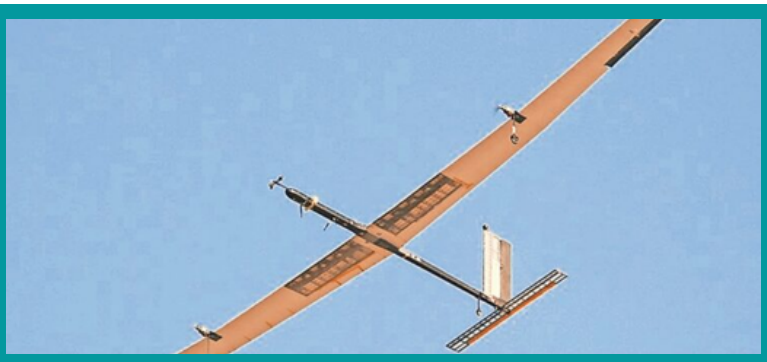

Image Source: janes.com

CSIR-NAL Tests High Altitude Pseudo Satellite (HAPS) Prototype

CSIR-National Aerospace Laboratories (NAL) has successfully tested a prototype of the High Altitude Pseudo Satellite (HAPS) in Challakere, Karnataka. HAPS, resembling drones but operating in the stratosphere, offers diverse applications from surveillance to 5G communication. The scaled-down prototype exceeded expectations, paving the way for a larger version with extended endurance. This achievement reflects India's strides in aerospace innovation.

Main Benefits of CSIR-NAL's HAPS Program:

- Enables enhanced surveillance capabilities with extended flight durations and high-altitude operation.
- Facilitates the establishment of robust communication networks, including 5G, in remote areas.
- Offers flexibility in mission planning and execution due to its ability to hover and cover vast areas.
- Provides a cost-effective alternative to traditional satellite systems for various applications.
- Drives advancements in solar-powered battery technology and aerospace engineering.
- Enhances national security by offering a platform for reconnaissance and monitoring of critical areas.
- Reduces carbon footprint compared to traditional aerial surveillance methods by utilizing solar power.
- Fosters self-reliance and independence in aerospace capabilities, reducing dependency on foreign technologies.
- Creates opportunities for indigenous manufacturing and research in the aerospace sector, contributing to economic growth.
- Promotes collaboration with other nations in the field of high-altitude unmanned aerial systems, fostering diplomatic relations and knowledge exchange.

CSIR Launches National Green Hydrogen Mission

The Government has initiated the National Green Hydrogen Mission to position India as a global leader in green hydrogen production, usage, and export. Spearheaded by the Ministry of New and Renewable Energy, the mission aims to foster a vibrant research and development ecosystem for the commercialization of green hydrogen.

Key Components:

- Pilot projects in sectors such as steel, mobility, and decentralized energy applications receive Rs. 1,466 crores in funding.
- A robust research and development program, backed by a public-private partnership framework, is established with an allocation of Rs. 400 crores.
- Council of Scientific & Industrial Research (CSIR) leads a Mission Mode Project investing Rs. 75 crores to develop indigenous electrolysers, fuel cells, and hydrogen storage cylinders, aiming for global efficiency standards.
- The Department of Science & Technology (DST) actively supports the Hydrogen and Fuel Cell program, encouraging indigenous development of materials and components for fuel cells, electrolyzers, and hydrogen storage systems.
- These initiatives reflect the government's dedication to advancing green hydrogen technologies and fostering sustainable development in the energy sector.

Image Source: pib.gov.in

CSIR-NIIST Partners with Maharashtra Company for Beta Glucosidase Enzyme Production

The National Institute of Interdisciplinary Science & Technology (CSIR-NIIST) has struck a technology transfer deal with Sarthak Metals Ltd, Maharashtra, for commercial production of beta glucosidase enzyme crucial for the biofuel industry.

Under the agreement, CSIR-NIIST will license Sarthak Metals Ltd to use the technology for beta glucosidase production via solid state fermentation (SSF) process using filamentous fungus. This enzyme aids in biomass hydrolysis, especially in combination with cellulases for biofuel production.

The technology transfer comes amidst increasing demand for cellulose cocktail due to the clearance of numerous 2G ethanol projects by the Government of India. BGL enzyme, when blended with acid cellulose and commercial enzyme preparations, has shown to enhance fermentation efficiency by up to 30% in bio refineries.

Moreover, the enzyme finds applications in various industries such as textiles, detergents, and organic synthesis.

Image Source: thehindu.com

India and Australia Develop Roadmap for Circular Plastics Economy

- India's plastics recycling rate at 8% in 2019; generates 26,000 tonnes of plastic waste daily.
- Consortium of Indian and Australian research organizations create roadmap for circular plastics economy by 2035.
- Goal: recycle 67% of plastic waste annually, with 52.9 million tonnes consumption.
- Seven policy areas identified: infrastructure, recycling, compliance, consumption, awareness, circular design, and commercial viability.
- Collaboration needed across government, finance, research, and industry.
- Mechanical and chemical recycling, AI, reverse logistics, and community-based solutions proposed.
- Key milestones: recycling and sorting infrastructure by 2025, capacity increase to 18.8 million tonnes by 2030.
- Aim to reduce landfill plastics by 30% and phase out single-use plastics by 2025.
- Roadmap aligns with UN Global Plastics Treaty (2024) requirements.
- Collaboration involves Australian and Indian research institutes including CSIRO, UNSW, UTS Institute for Sustainable Futures, TERI, CSIR-NEERI, and Development Alternatives.

Image Source: sustainableplastics.com

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Image Source: economictimes.indiatimes.com

Cipla Collaborates with CSIR-CDRI for Novel Ophthalmic Formulation

- **Cipla partners with CSIR-Central Drug Research Institute (CDRI) to develop innovative ophthalmic formulation for fungal keratitis.**
- **Collaboration aims to leverage expertise and resources for developing safe and effective drug.**
- **Fungal keratitis affects around 1.2 million globally annually, with higher incidence in tropical countries.**
- **Risk factors include ocular trauma, exposure to fungal pathogens, use of steroid eye drops, poor hygiene, and contact lens wear.**
- **Untreated fungal keratitis can lead to vision loss due to corneal destruction.**
- **CSIR-CDRI developed prototype formulation showing promising results in pre-clinical studies.**
- **Cipla to scale up production, conduct necessary studies, and seek regulatory approvals for commercialization.**
- **Aim is to provide accessible and cost-effective solution for India's clinical needs.**
- **CSIR-CDRI Director emphasizes focus on innovative solutions for unmet clinical needs, highlighting unique formulation developed.**

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Image Source: newindianexpress.com

NIO and Odisha Fisheries Department Collaborate for Sustainable Marine Ecosystems

NIO scientists are teaming up with the Odisha fisheries department to build artificial reefs along the state's coast. This project, part of the PMMSY scheme, will cost around Rs 29 crore. These reefs will mimic natural environments, helping marine life thrive and promoting sustainable fishing practices. The goal is to relocate these reefs to create diverse habitats for marine species, boosting biodiversity and improving the marine ecosystem along the Odisha coast. The project aims to increase fishermen's income and enhance marine fisheries production and exports. NIO director Sunil Kumar Singh highlighted Odisha's 485-km coastline and the importance of the PMMSY scheme in supporting fishermen. As knowledge partners, NIO will assist in achieving these goals. The project's success relies on a scientific approach to design and implement artificial reefs resembling natural habitats. It sets an example for sustainable development in coastal areas and demonstrates the potential of artificial reefs to support biodiversity and maintain the health of India's coastal waters.

CSIR-NPL Study: High Usage of Traditional Cooking Fuels in Northeast India

More than half of rural Assam, Arunachal Pradesh, and Meghalaya use firewood and biomass for cooking, causing pollution. A study by IIT Mandi, with CSIR-NPL and INRS, found higher health risks from aerosol exposure in traditional kitchens compared to LPG. Despite advancements, the persistent use of traditional cooking fuels in northeastern India is leading to the release of harmful pollutants, highlighting the need for alternative cooking methods to improve indoor air quality. make it short and effective. This underscores the urgent need for cleaner cooking alternatives in the region.

Image Source: energy.economictimes.indiatimes.com

CSIR-IICT, KAMP, and CBSE Collaborate for Cutting-Edge Teacher Training on Scientific Temperament Enhancement

Image Source: pib.gov.in

CSIR-IICT, KAMP, and CBSE have teamed up to conduct a specialized teacher training program focused on enhancing scientific temperament among educators. This collaborative effort aims to equip teachers with innovative teaching methodologies and deepen their understanding of key scientific concepts. By leveraging the expertise of renowned scientists, the initiative seeks to revolutionize science education and foster a generation of scientifically literate individuals.

Benefits of training:

- Educators enhance scientific temperament through technological interventions.
- Comprehensive training sessions cover various dimensions of science education.
- Interaction with scientists deepens understanding of science and its applications.
- Lab visits provide practical knowledge on technology like Anaerobic Gas Lift Reactor.
- KAMP promotes experiential learning for educators and students.
- Educators learn about upcoming activities like online sessions and scientific excursions.
- CBSE's training programs improve curriculum understanding and delivery.
- KAMP fosters creativity and critical thinking skills in students.

CSIR-NIIST Partners with Lucknow Startup to Produce Biodegradable Tableware from Agro Waste

CSIR-NIIST, Thiruvananthapuram, has partnered with East Corridor Consultant India Pvt. Ltd., Lucknow, to transfer technology for making single-use biodegradable tableware from rice and wheat waste. The cutlery, which can hold hot and liquid food, remains shelf-stable for up to 10-12 months and resists microbial growth for a year in India's humid climate. It costs between ₹1.5 to ₹2 per 10 cm plate and fully degrades within two months after use. This initiative not only reduces air pollution from stubble burning but also provides income opportunities for farmers and rural employment. Dr. Anandharamakrishnan, CSIR-NIIST Director, highlighted the potential for entrepreneurs to set up plants with capacities ranging from 500 kg to 3 tonnes per day, with machinery costs varying from ₹50 lakh to ₹2 crore.

Image Source: thehindu.com

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CSIR-IIIM's Aroma Mission Empowers Farmers for a Sustainable Future

Dr. Jitendra Singh, Union Minister of State for Science & Technology, inaugurated an awareness and training program in Basohli under CSIR-IIIM's Aroma Mission. The program distributes lavender quality planting material to farmers, promoting sustainable farming. Dr. Singh highlighted the mission's success, spreading lavender cultivation to Himachal Pradesh, Uttarakhand, and other states, creating income opportunities. The event, attended by over 750 farmers, focused on eco-friendly farming practices and provided guidance on cultivation techniques.

Image Source: iiim.res.in

Green Hydrogen Vital for India's Energy Shift: CSIR-NCL Director

image Source: energy.economictimes.indiatimes.com

CSIR-NCL Director, Ashish Lele, highlighted the significance of Green Hydrogen in India's energy transition, emphasizing its low carbon emissions. Speaking at a lecture in Hyderabad, he underscored its role in industrial and commercial sectors. CCMB Director Vinay Nandicoori commemorated the institute's Founder's Day, emphasizing CCMB's commitment to societal impact and scientific innovation.

CSIR-CLRI Starts Making Indian Shoe Sizes by 2025, Focusing on Health and Wide Feet

N Kalaiselvi, CSIR's director general, announced that by 2025, India will introduce its own footwear sizing system, replacing US and UK standards. The Central Leather Research Institute (CLRI) completed a nationwide feet scanning survey involving over 1 lakh people across 73 districts. The report, submitted to the Bureau of Indian Standards, will inform the new sizing system, considering both foot length and width. CLRI aims to develop footwear addressing healthcare needs, collaborating with medical professionals to create options for orthopedic, diabetic, and hormonal imbalance issues. A user trial involving 10,000 participants will precede the market release of footwear with Indian sizes, projected after 18 months.

Image Source: newindianexpress.com

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Image Source: health.economictimes.indiatimes.com

CDRI Focuses on Affordable Healthcare with Major Drug Development

The Central Drug Research Institute (CDRI) is targeting affordable healthcare solutions by developing around a dozen major drugs this year. These include Umifenovir for Covid-19, Picroliv for non-alcoholic fatty liver, and Centinhale for drug-sensitive TB. CDRI's director, Radha Rangarajan, emphasized the institute's commitment to research and development for accessible healthcare. They're also collaborating with industry partners like Dr. Reddy's Laboratories and Cipla for drug development projects. Additionally, CDRI is exploring artificial intelligence with Sravathi AI Pvt Ltd for drug discovery and continuing research on contraception with support from the Bill and Melinda Gates Foundation.

Benefits of CDRI's Drug Development Initiatives:

- Affordable healthcare solutions
- Development of major drugs for various diseases
- Focus on Covid-19, non-alcoholic fatty liver, drug-sensitive TB, and contraception
- Collaboration with industry for market access
- Exploration of artificial intelligence for drug discovery
- Continued research supported by the Bill and Melinda Gates Foundation

Kerala Pollution Control Board Partners with CSIR-NEERI to Study Polluted Canals

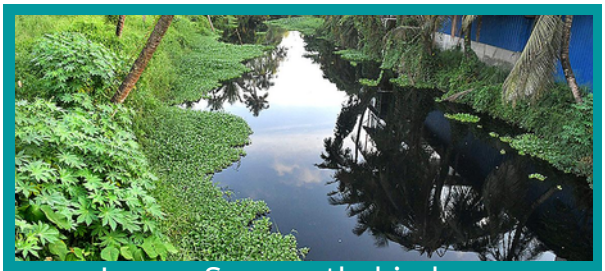

Image Source: thehindu.com

The Kerala State Pollution Control Board (KCBC) has teamed up with CSIR-NEERI to study polluted canals in Karunagappally and Kochi. An MoU was signed to develop a treatment method for Pallikkalar, Edappally, and Perandoor canals. The project, funded by the board's environment protection fund, aims to address increasing pollution, following a directive from the National Green Tribunal. NEERI scientists will estimate sewage pollution, survey canal topography, and propose treatment designs within 12 months. The study will explore a package treatment method involving physical, chemical, and biological processes to remove contaminants. The tribunal urged temporary measures like phytorid wastewater treatment while emphasizing the importance of canal rejuvenation projects.

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image Source: knocksense.com

CSIR-IITR to Assess Environmental Impact of Waste Treatment in Lucknow

The CSIR-Indian Institute of Toxicology Research (CSIR-IITR) has offered to assess how treating 20 lakh tonnes of waste at the Shivri waste management site in Lucknow district affects the environment. The plan involves checking the waste for harmful chemicals before and after treatment, testing the air pollution quarterly, and using advanced methods. They'll analyze wastewater, groundwater, and soil to see how polluted they are. The team will speed up the natural breakdown of waste and check if it's safe after treatment by studying earthworms and zebrafish. They expect better knowledge of air pollution, safer treated waste, and a healthier environment for workers and locals. If approved, this could set a good example for managing waste in cities. Arvind Rao, an official, says they're considering it because it takes the right steps in treating old waste.

CSIR-IMTECH Initiates the ISLEVL (Indian Sign Language Enabled Virtual Laboratory)

image source: tribuneindia.com

Dr. Alka Rao and her team created the Indian Sign Language Enabled Virtual Laboratory (ISLEVL) to help deaf or hard-of-hearing people learn science in India. They made 100 signs in Indian Sign Language (ISL) and 500 videos to explain science topics. This is important because many deaf people struggle with science due to a lack of sign language. Inspired by a student's question about "centrifuge," they've worked hard for eight years to make science accessible. They got support from groups like CSIR and held workshops, translated materials, and trained staff. Thousands of people have benefited. Signs for tough words like "centrifuge," "xylem," and "algae" were introduced. These signs help deaf people understand science better, opening up new opportunities. The effort was soon extended to the CSIR outreach programme 'Jigyasa', which was aimed at generating curiosity among schoolchildren and motivating them to opt for STEM subjects in higher education. Dr. Rao's team wants to keep growing their project and involve more scientists. Their work fits with the Project's goal of helping people with disabilities worldwide.

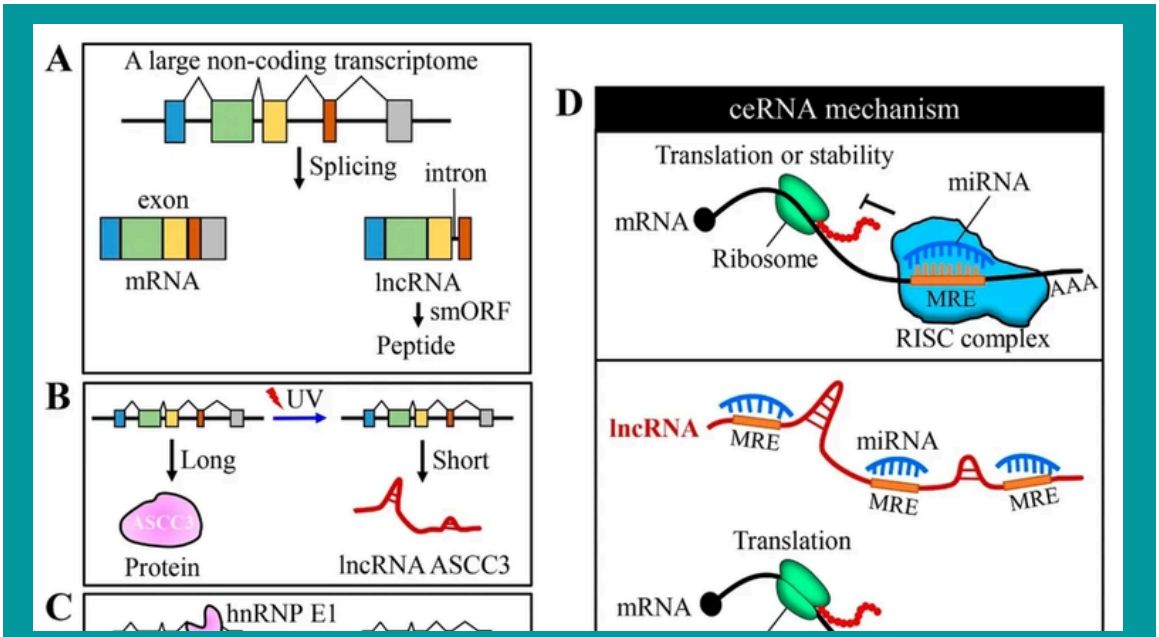

Image Source: bnnbreaking.com

Understanding COVID-19 Better: Key Discoveries About Hidden RNA

In a major study by CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB) in Delhi, India, scientists have revealed the important role of long non-coding RNAs (lncRNAs) in how severe COVID-19 gets and how people recover. By looking closely at these special RNAs, they found out how they change over time during and after a person gets infected with the virus. This study gives us clues about possible treatments.

- What They Found: Using a technique called single-cell RNA sequencing, they found 203 lncRNAs that behaved differently on examining a COVID-19 patient's sample. Some of these RNAs are specific to certain types of cells and help control how the immune system works in different parts of the body.
- What This Means: The study showed that lncRNAs can do different things when the body fights off viruses. For example, one lncRNA named EGOT can sometimes stop the virus from multiplying, while other times it spreads. This shows how complicated the body's defense system can be.
- What Comes Next: This study informs one, to learn more about lncRNAs and how they affect diseases like COVID-19. By understanding these hidden parts of our genetic code, we can come up with better ways to treat infections. The study was published in a scientific journal called NAR Genomics & Bioinformatics.
- Why It Matters: This research not only teaches us a lot about COVID-19, but it also shows us how important it is to study all parts of our genes, not just the ones that make proteins. By doing more research like this, we can find new ways to fight off diseases like COVID-19 and help people get better faster.

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Innovations and Contributions by CSIR labs

In this issue:

Image Source: thehillstimes.in

CSIR-NEIST Unveils Advanced Structural Testing Facility in Jorhat

CSIR-North East Institute of Science and Technology in Jorhat has unveiled a cutting-edge loading frame facility, capable of handling loads up to 3000 kN. Dr. Virendra M. Tiwari, the director of CSIR NEIST, inaugurated the facility on Wednesday in the presence of institute staff.

- The facility is designed to test the strength and behavior of structural elements like beams, columns, trusses, etc., crucial for construction projects like bridges and dams.
- It received support from the Ministry of Housing & Urban Affairs, Government of India, through BMTPC under the ASHA-India scheme.
- Expected to benefit not only the institute but also the entire North East region by enhancing infrastructure development capabilities.

CDRI Develops Oral Pill to Speed Up Bone Healing

Lucknow's Central Drug Research Institute (CDRI) has created a pill that could make healing after a fracture faster. They're working on two types: CDRI-1500 and CDRI-399. They got the necessary approvals from drug agencies, and soon they'll start the first phase of testing CDRI-1500.

Tests show that this pill can speed up healing and improve bone health for conditions like osteoporosis. CDRI says the drug, CDRI-1500, helps bones heal faster by making more callus at the fracture site.

This pill is safe, affordable, and the first of its kind.

Image Source: timesofindia.indiatimes.com

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image Source: business-standard.com

CSIR-NIO Study Unveils Microplastic Risks

A study by CSIR-National Institute of Oceanography found microplastics in Ganga and Yamuna rivers, posing risks to the Indo-Gangetic plain. These tiny plastic pieces come from consumer and industrial waste, with higher concentrations during the wet season. The research highlights areas like Haridwar, Agra, and Patna as hotspots for plastic pollution. Municipalities need action plans to tackle this issue, targeting pollution sources. The study suggests that during the dry season, waste accumulates from upstream cities and is washed away during the wet season, spreading microplastics. However, distinguishing local and upstream sources of plastic is challenging.

CSIR-CRRI and IMTECH Pioneering Steel Slag Roads

Two labs of the Council for Scientific and Industrial Research (CSIR) will pioneer steel slag roads in the city. Steel slag, a byproduct of steel production, will be used for its strong structure, making roads 30% thinner and more durable. This eco-friendly approach will tackle the steel waste in Mandi Gobindgarh, Punjab. Teams from CSIR labs CRRI, CSIO, and IMTECH are collaborating for this project, utilizing steel slag from local plants. This follows the success of India's first steel slag road in Surat, and the National Highways Authority of India is adopting this technology on the Mumbai to Goa highway.

Image Source: tribuneindia.com

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SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

Image Source: thehindu.com

CSIR-IICT Converts Dry Leaves into Soil Conditioner: A Simple and Cost-Effective Solution

- CSIR-IICT, known for its bio-methanation technology, has now converted its Anaerobic Gaslift Reactor (AGR) to turn dry leaves into a soil conditioner.
- This new method, Accelerated Anaerobic Composting (ACC), is simpler, four times cheaper, and requires minimal expertise.
- A ₹7.5-lakh 500-kg capacity ACC reactor was set up in a gated community, Maple Town Villas, producing 10 tonnes of soil conditioner in a few months.
- The soil conditioner meets agriculture ministry standards for nitrogen, carbon, and other content.
- The technology can also treat domestic waste efficiently.
- CSIR-IICT's chief scientist, A. Gangagni Rao, has overseen the establishment of over 30 AGR-based plants nationwide, including one mentioned by Prime Minister Narendra Modi for its biogas generation.

CSIR-IIIM Reveals Stress-Management Genes in Licorice Plants

- Researchers at CSIR-IIIM Jammu studied Glycyrrhiza glabra, commonly known as licorice, to understand how plants cope with stress.
- They found 181 ATP-binding cassette (ABC) transporters in licorice, which help transport substances across cell membranes.
- Nine of these transporters, called GgABCBs, responded significantly to the plant hormone auxin, crucial for growth and development.
- The study showed that these transporters are involved in stress responses, especially drought, suggesting their potential in improving plant resilience.
- This research expands our knowledge of plant biology and offers insights into developing stress-resistant plants.
- By identifying these genes in licorice, the study opens doors for future biotechnological interventions to enhance plant productivity and resilience.

Image Source: naturalsciencenews.com

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