SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

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A Study Revealed Women at Higher Risk for Long COVID-19

- A recent study in Scientific Reports by Dr D Y Patil Medical College, Hospital and Research Centre and CSIR-IGIB in New Delhi found that women are at a higher risk of experiencing long COVID-19 compared to men.
- The persistent weakness and tiredness were the most common symptoms lasting from 12 weeks to 6 months. Loss of smell, headaches, and respiratory issues are some of the other symptoms
- 216 out of 3,329 healthcare workers studied suffered from long COVID-19. According to the data analysed in the study, women were found to be more susceptible.
- The study also pointed out the reinfections in vaccinated individuals. Alcohol use disorder was associated with a higher risk of long COVID-19 due to its impact on liver function and the immune system.
- The findings highlight the importance of understanding and addressing long COVID-19 risks, especially among women and those with alcohol consumption habits.

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Governor of Manipur Distributed Honey-Bee Boxes under CSIR — Floriculture and Aroma Mission Projects

- Anusuiya Uikey, the Governor of Manipur, gave honey-bee boxes to selected farmers as a part of CSIR's Floriculture and Aroma Mission to support them in their livelihood.
- CSIR-North East Institute of Science and Technology organized this event at the Raj Bhavan.
- The Governor appreciated CSIR for using science to improve the lives of farmers and protect biodiversity through eco-friendly projects.

The director of the National Botanical Research Institute inaugurated a state-of-the-art 'Plant growth chamber' facility at the Central Institute of Medicinal and Aromatic Plants (CIMAP)

- On the occassion of Central Institute of Medicinal and Aromatic Plant's Foundation Day, the Director of tha National Botanical Research Institute inaugurated a state-of-the-art plant growth chamber that helps researchers in controlling environmental conditions for growing plants for their research.
- The plant that can be grown in summer for suppose can be grown in any season using this plant chamber by setting up the right environmental conditions using it.
- The Director of National Botanical Research Institute further emphasized the role of CIMAP in making India a lead exporter of essential oils like methanolic mint and lemongrass.

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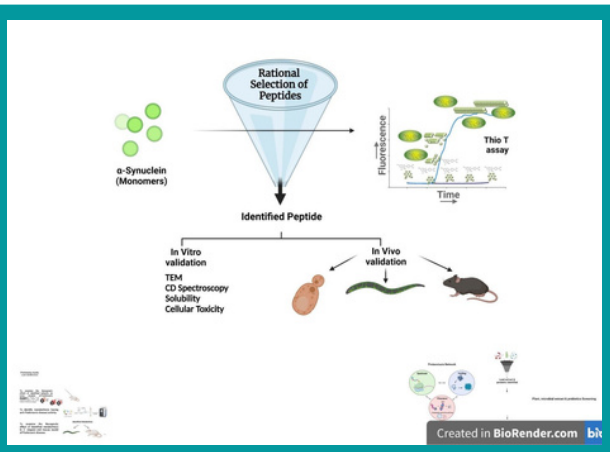

Image Source: imtech.res.in

IMTECH-Led Team Discovers Potential Parkinson's Cure

- **Researchers from the Institute of Microbial Technology (IMTECH) in Chandigarh, India, along with collaborators from Denmark, have discovered a molecule that could potentially cure Parkinson's disease, a condition that affects the brain and causes movement problems.**
- **They found this molecule after studying mice and have filed a patent for it, along with three other promising molecules. These molecules could potentially provide a cure for Parkinson's.**
- **The team also includes researchers from IIT Bombay, IIT Delhi, and the Central Drug Research Institute in Lucknow. They are planning further studies to see how well the molecule works in animals.**
- **Parkinson's disease is usually treated with drugs that replace dopamine, a chemical in the brain. But these drugs have side effects and don't protect the brain cells from degeneration.**
- **The researchers tested their molecule on mice for 22 weeks. They found that the diseased mice lost their grip over time, but the mice treated with the molecule remained healthy.**
- **This discovery is significant because it could lead to a cure for Parkinson's disease, which currently has no cure.**

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CSIR-IIIM in Collaboration with National Highway Authority of India started the Lavender Hub Project at NH 44

In this issue:

- CSIR IIIM kickstarts 'Lavender Hub Project' at NH 44

Image Source: iiiim.res.in

CSIR focuses on medicinal properties of lavender

- **The first-ever project to beautify national Highway 44 has been started by CSIR-IIM along with National Highway Authority of India.**
- **This project on successful implementaion aims to transform the highway into sustainable model for income generation.**
- **Memorandum of Understanding (MoU) was signed on 18th March 2024 in the presence of the Union Minister of Science & Technology and the Vice-President of CSIR.**
- **The project will cover approximately 200 kanals over the next five years.**
- **This is a joint project between CSIR-IIIM and NHAI, with a total cost of Rs 283.80 lakhs, shared equally by both partners.**
- **The initiative will enhance the visual appeal of the area of the highway and promote sustainability through post-plantation practices and support for local agri-entrepreneurship.**

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Image Source: clri.org

CLRI Develops Innovative Footwear to Heal Diabetic Foot Ulcers and Prevent Amputations

- Researchers from the Central Leather Research Institute (CLRI) have developed special footwear to help heal foot ulcers faster in people with diabetes. These ulcers can lead to lower limb amputation, but the new footwear, called ankle-foot orthosis (AFO), can reduce this risk.
- The AFO redistributes pressure on the foot, particularly at the ulcer site, which speeds up healing. It also improves walking ability. This footwear is especially beneficial for high-risk patients with diabetes.
- Diabetic foot ulcers can occur due to various reasons like high blood sugar, cholesterol buildup in leg arteries, foot deformities, or improper foot care.
- Current treatments include custom footwear or external devices, but they may not work for everyone, especially those at high risk of amputation. The new AFO comes in standard sizes for both men and women and can be modified for individual needs.
- The cost of the AFO is estimated to be around 10,000 rupees. CLRI plans to set up an orthotics workshop for field testing soon.

New Genetic Insights into Sri Lanka's Indigenous Vedda People by CSIR-CCMB

- Researchers from CSIR-Centre for Cellular and Molecular Biology (CCMB) have uncovered fascinating insights into the origins of Sri Lanka's indigenous Vedda community. The study led by Dr. K Thangaraj found that despite linguistic differences, the Vedda share significant genetic similarities with ethnic populations in India.
- Dr. Ruwandi Ranasingh, the lead author from Colombo University, suggests that the Vedda population has a unique genetic makeup which limited the genetic flow from neighboring Sinhalese and Sri Lankan Tamil populations as a result of genetic drift and a recent bottleneck.
- The research sheds new light on the demographic history of Sri Lanka and the broader South Asian region. CCMB director, Dr. Vinay Nandicoori, believes these insights will deepen our understanding of genetic diversity in South Asia and celebrate the unique cultural and genetic heritage of the Vedda people.

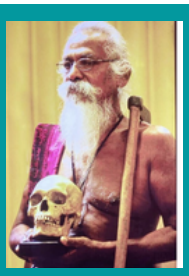

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Image Source: csmri.res.in

New Mobile Water Purification System Developed for Emergencies by CSMCRI

- The Central Salt and Marine Chemicals Research Institute (CSMCRI) in Bhavnagar has created a mobile water purification system.
- Mounted on a pickup van, it can provide clean drinking water in emergencies, even from salty sources, without needing external power.
- CSMCRI has licensed the technology to a Nagpur-based company for commercialization.
- The system can produce over 2500 liters of drinkable water per hour and is cost-effective, using diesel or solar power.
- It's designed to handle various water sources and can be used during disasters like floods.
- The technology has garnered interest since it was showcased by Israeli Prime Minister Netanyahu in 2018.

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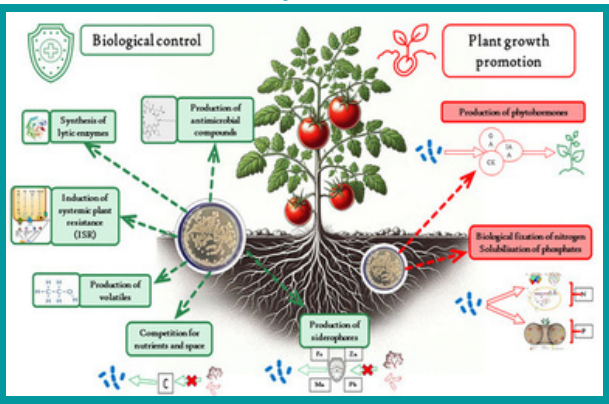

Image Source :mdpi.com

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CSIR-NBRI: Tequila Bacteria Boosts Tomato Health and Fights Deadly Disease

CSIR-NAL gave the last set of engine bay door parts for Tejas Mk1A to HAL. This completes the agreement made in November 2 Researchers at the CSIR-National Botanical Research Institute have discovered that the beneficial bacteria Bacillus tequilensis PBE-1 can protect tomatoes from Fusarium wilt, a disease caused by the fungus Fusarium oxysporum. This disease affects tomatoes and over 100 other plant species and can be dangerous to people with weak immune systems. Treating tomato plants with PBE-1 strengthens their cell walls, making them more resistant to the disease, and improves their overall health, including better water regulation and energy production.023. HAL can now produce these parts directly using advanced materials. CSIR-NAL's technology helps save money and make the aircraft lighter. The Tejas Mk1A recently had its first flight with these parts.

Key findings of the study include:

- **Increased Lignin: PBE-1 treatment led to more lignin in plant cells, strengthening them against the disease.**
- **Improved Plant Functions: Treated plants had better transpiration, photosynthesis, and stomatal conductance.**
- **Gene Expression: Defense genes in treated plants were less active, indicating that the plants stayed healthier and functioned normally.**
- **Healthy Soil Microflora: The bacteria treatment did not harm the beneficial microbes in the soil; instead, it improved their activity.**

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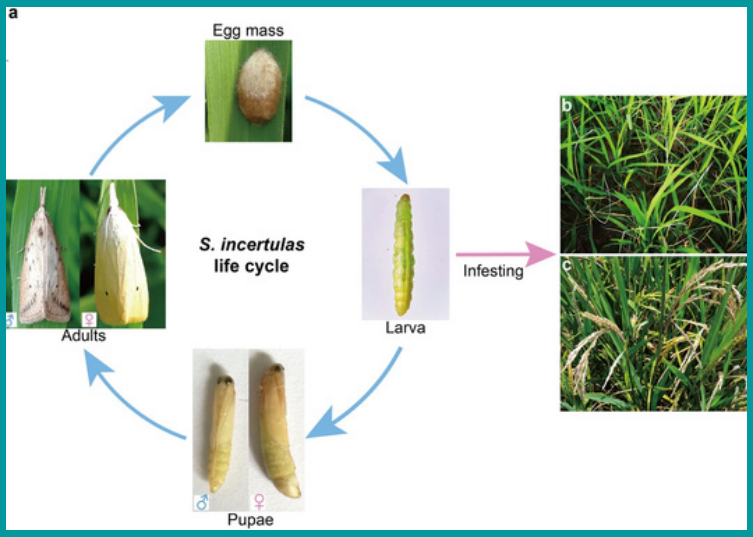

Image Source: nature.com

This is only a representative image from the source mentioned.

Scientists at CSIR-CCMB & ICAR Identify Rice Line Resistant to Yellow Stem Borer Pest

- **Scientists at Hyderabad's CSIR-Centre for Cellular and Molecular Biology and ICAR-Indian Institute of Rice Research have developed a rice variety resistant to the Yellow Stem Borer (YSB) pest.**
- **Field tests showed less than 10% damage in the resistant variety compared to 40-60% in non-resistant ones.**
- **Registered for further trials, this rice uses advanced genetic techniques to understand its resistance, potentially reducing reliance on harmful pesticides.**
- **This breakthrough could lead to more sustainable rice farming and help transfer YSB resistance to other rice varieties.**

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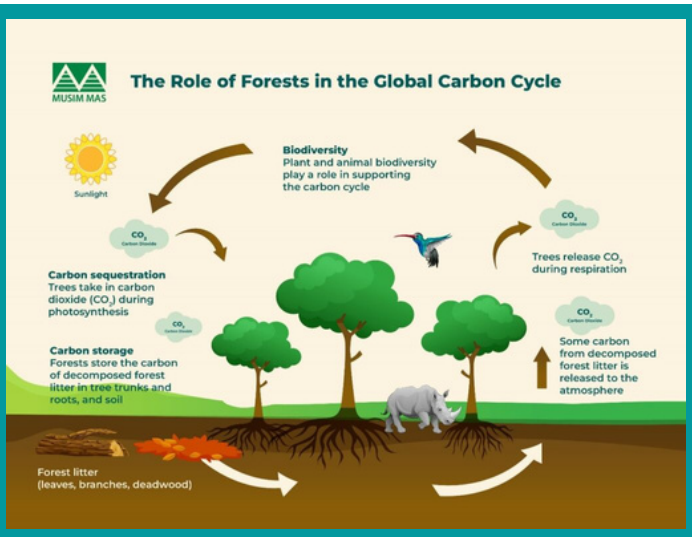

Image source: mussimmas.com
This is only a representative image from the source mentioned.

CSIR-NBRI Installs New Eddy Covariance Tower in Similipal Biosphere Reserve to Study Forest Carbon Sequestration

- **CSIR-National Botanical Research Institute (NBRI) in Lucknow has set up an Eddy covariance flux tower at Similipal Biosphere Reserve to study forest carbon sequestration and climate change. The tower, located at Pithabata South Range, measures CO2, H2O, and energy exchanges between the forest and atmosphere.**
- **This is CSIR's first carbon flux study in a semi-evergreen forest in India. The data will help predict climate change impacts and aid future forest management.**
- **Ajit Kumar Shasany and Prakash Chand Gogineni inaugurated the project, led by Soumit Kumar Behera with teams from CSIR, IMMT, and IIT Kharagpur, and funded by CSIR and the Department of Biotechnology.**

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Image Source: niist.res.in

CSIR-NIIST collaborates with Kerala firm to make vegan leather

- CSIR-NIIST has partnered with Kerala-based Alter Wave Eco Innovations (AWEI) to transfer its vegan leather manufacturing technology, as reported by IANS. This eco-friendly technology uses plant sources like pineapple leaves, banana stems, and rice straws without plastic.
- The agreement was signed at the NIIST campus by Director C. Anandharamakrishnan and Jeswin George. Anandharamakrishnan highlighted that the collaboration combines NIIST's expertise with AWEI's commitment to sustainable manufacturing while providing farmers with an additional income stream.
- With around 20,000 hectares of pineapple farms in Kerala generating significant waste, this initiative upcycles farm residues into non-toxic, durable materials for fashion and automotive industries.

Big breakthrough by NEERI, scientists remove poisonous mercury from toxic site at Kodaikanal hills

NEERI scientists successfully removed mercury contamination from a 20-acre factory site in Kodaikanal, Tamil Nadu, marking India's first full-scale industrial hazardous waste cleanup. Led by Dr. Mahendra Patil under NEERI Director Dr. Atul Vaidya, the project used advanced technology to reduce mercury levels to a safe limit. Regulatory delays postponed the cleanup until 2016, with most work completed between 2021 and 2024 despite weather challenges. Supported by industry funding and a Supreme Court directive, this project highlights the need for large-scale remediation, as over 300 hazardous waste sites remain contaminated across India.

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Image Source: nal.res.in

CSIR NAL Develops Floating Earthmover for Waterbody Cleanup

- **What began as a 12-foot boat in 2017 has evolved into a 40-foot long floating earthmover, "Jaldost," developed by CSIR National Aerospace Laboratories (NAL). Designed to clear water hyacinth and garbage from water bodies up to two feet deep, Jaldost is now in the commercial production stage after successful prototype testing.**
- **The commercial arm of the project, Shri Vari Engineering Systems Pvt Ltd, is confident of manufacturing another unit within three months and is in discussions with BBMP for potential procurement.**
- **Project leader Karthikeyan from CSIR NAL highlighted the successful field tests, including the clearing of 20 tonnes of weeds from Ulsoor Lake and 2,000 tonnes hyacinth from Manchanabele Reservoir.**
- **The indigenous airboat system, developed using aerospace engineering principles, weighs just four tonnes, making it an affordable alternative to imported equipment, which would cost around Rs 2.5 crore. Jaldost offers a more cost-effective solution for cleaning city lakes, and its capabilities have already made a positive impact on waterbody management in the region.**

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Image Source: crridom.gov.in

CSIR-CRRI Leads the Way in Sustainable Road Construction with Steel Slag Initiative

- India is advancing sustainable infrastructure by using steel slag, a byproduct of the steel industry, in road construction.
- Dr. V.K. Saraswat of NITI Aayog introduced new guidelines at the First International Conference on Steel Slag Road in New Delhi.
- These guidelines, developed with the help of CSIR and the Ministry of Steel, aim to reduce environmental impact, save costs, and improve road quality.
- A notable example is the Steel Slag Road between Mumbai and Goa, which has proven the effectiveness of this innovative approach.

CSIR-IGIB Develops Advanced Gene Editing Tool for Treating Genetic Disorders

- CSIR-IGIB, in collaboration with LV Prasad Eye Institute, has developed an advanced CRISPR-Cas9 gene editing tool that offers higher precision and efficiency.
- This new tool, engineered from the Francisella novicida bacterium, was successfully used to correct a gene mutation responsible for a severe vision disorder, Leber's congenital amaurosis (LCA2).
- The enhanced tool shows great promise for treating various genetic disorders, bringing gene therapy closer to clinical applications.

Image Source: csirnews.niscpr.res.in

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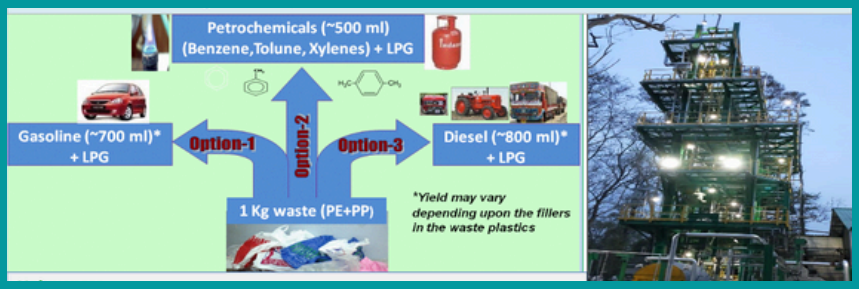

Image Source: iip.res.in

CSIR-NCL's Groundbreaking Plastic-to-Diesel Technology: A Leap Towards Sustainability

- **The National Chemical Laboratory (NCL) in Pune, under CSIR, has developed a pioneering process to convert waste plastic into BS6-grade diesel.**
- **Led by Dr. Samir H. Chikkali, this project focuses on recycling polyethylene and polypropylene, addressing plastic pollution and promoting sustainable fuel production.**
- **Developed with GAIL, the technology operates at one tonne per day and is ready for commercialization.**
- **NCL's initiative not only tackles environmental challenges but also positions itself as a leader in sustainable innovation.**

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CSIR-NIIST's Technology is Turning Sugarcane Waste into Vegan Leather Boosts Farmers' Income

- Sugarcane bagasse, a byproduct of sugar production, is now being used to create vegan leather, offering a new income stream for farmers. PA Footwear P Ltd developed the technology, helping to reduce waste and produce eco-friendly products like shoes and bags.
- Animal rights group PETA India has praised this innovation, noting that India, as a major sugarcane producer, has great potential to expand the use of sugarcane-based vegan leather. PETA also highlighted that many global brands are now adopting vegan materials, with over 1,000 brands using the "PETA-Approved Vegan" certification for their products.
- This initiative not only supports the circular economy by turning waste into valuable products but also helps sugarcane farmers earn more, while promoting eco-friendly alternatives to traditional leather. It aligns with global trends toward sustainability and reducing environmental impact.

High Antimicrobial Resistance Found in Hyderabad Sewage

- A study by the Indian Institute of Chemical Technology (IICT) in Hyderabad has revealed alarming levels of antimicrobial resistance (AMR) in the city's sewage, particularly during winter. Conducted in Tarnaka, Habsiguda, and Lalaguda, the research found that random antibiotic use and untreated wastewater discharge are major contributors to the spread of antibiotic-resistant genes (ARGs).
- Researchers analyzed 123 ARGs over five months (Dec 2021 to April 2022), discovering that around 50% of these genes were consistently present each month. The study highlighted significant resistance to important antibiotics, including beta-lactams and aminoglycosides. The findings underscore the need for better AMR control policies and responsible antibiotic use, as resistance was found in eight of the nine major ARG classes tested, with the highest levels detected in March.

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IMMT Leads India's First Green Steel Initiative Using Hydrogen

- A consortium led by the Institute of Minerals and Materials Technology (IMMT) is piloting India's first green steel project using hydrogen to produce low-carbon steel. This initiative, supported by the Ministry of Steel under the National Green Hydrogen Mission, aims to reduce the steel industry's CO_2 emissions by replacing fossil fuels with hydrogen. Efforts are also underway to lower hydrogen costs, with government incentives and additional funding through the SIGHT scheme.

TB Remains a Major Killer Despite Antibiotics

- Dr. Vinay Nandicoori, director of CSIR-CCMB, highlighted that tuberculosis (TB) remains the deadliest infectious disease, causing around 1.5 million deaths annually, despite the use of over 20 antibiotics and the century-old BCG vaccine. Speaking at the Rajiv Gandhi Centre for Biotechnology in Thiruvananthapuram, he emphasized the urgent need for new drugs due to the rise of drug-resistant TB strains and TB-HIV co-infections.
- Dr. Nandicoori explained that TB isn't just limited to the lungs; it can affect various organs, making diagnosis difficult. Treating TB typically takes 4-6 months, but multi-drug resistant TB can take 9 months to a year or more. He stressed the importance of ongoing research to find better treatments, noting that while vaccines were developed for COVID-19, creating an effective TB vaccine remains a significant challenge.

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Image Source: wbpcb.gov.in

CSIR-NEERI to Analyze Hazardous Waste at Cuncolim Industrial Estate

- **The Goa State Pollution Control Board (GSPCB) has tasked the CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) with analyzing hazardous waste at the Cuncolim Industrial Estate. The analysis aims to determine the level of hazard and explore potential alternative uses for the waste. This decision comes after repeated concerns from local residents about the waste stored by M/s Sunrise Zinc Ltd. Over the past five years, GSPCB has spent ₹21.31 lakh on covering the waste to prevent water contamination. Based on CSIR-NEERI's findings, the GSPCB will decide on further action, according to Environment Minister Aleixo Sequeira.**

WBPCB to Acquire Machine for Converting Domestic Waste into Fuel

- **The West Bengal Pollution Control Board (WBPCB) is set to procure a machine that converts mixed domestic waste, including plastic, into Refuse Derived Fuel (RDF) for electricity production.**
- **Initially, pilot projects will be set up in Kolkata and Bidhannagar, with plans to expand if successful.**
- **WBPCB is also promoting biodegradable plastics and converting plastic waste into RDF at multiple dumpsites.**
- **State Environment Minister Md. Ghulam Rabbani highlighted the state's efforts in air quality monitoring and urged industries to adopt green technologies.**

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Image Source: isro.gov.in

ISRO Successfully Tests Air Breathing Propulsion Technology

- **The Indian Space Research Organisation (ISRO) successfully completed the second test of its Air Breathing Propulsion Technology on Tuesday. The test took place at 7:00 am from the Satish Dhawan Space Centre in Sriharikota, using ISRO's heaviest sounding rocket, the RH-560. This technology allows rockets to use atmospheric oxygen, which can reduce the weight of the rocket and increase its payload capacity. During the test, the propulsion systems worked as expected, and nearly 110 parameters were monitored to gather valuable data. This successful demonstration marks a significant step forward for ISRO, paving the way for more efficient and cost-effective space missions in the future.**

Genetic Study Reveals Why Some East Indian Tribes Are Adopting Indo-European Languages

Image Source: ccmb.res.in

- **A genetic study by scientists from the CCMB in Hyderabad and the Birbal Sahni Institute in Lucknow found that industrialization and cultural exchange have led some East Indian tribal populations to adopt Indo-European languages. Traditionally, about 5% of Indians, mainly in Odisha, Chhattisgarh, and Jharkhand, speak Austroasiatic languages, which have been used for over 4,000 years. However, tribes like the Bathudi, Bhumij, Ho, and Mahali have started speaking Indo-European languages due to close cultural interactions, such as marriage, trade, and education, with neighboring Indo-European speakers. The study highlights that these linguistic shifts are mainly due to recent social changes, posing a threat to the survival of Austroasiatic languages if the trend continues.**

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Image Source: pib.gov.in

New Zinc-Air Battery Works Efficiently in Extreme Cold, Offering Reliable Energy for Remote Areas

- **Researchers at CSIR-CMERI, Durgapur, led by Dr. Aniruddha Kundu, have developed a new type of zinc-air battery that works efficiently in extreme cold, such as in remote Himalayan regions. This battery uses a special cathode material made from a CoFe alloy and Fe3C nanoparticles, combined with a gel electrolyte, allowing it to perform well even at sub-zero temperatures.**
- **Traditional lithium-ion batteries face limitations due to their heavy materials and energy density constraints. In contrast, metal-air batteries, which use lighter metals and oxygen, offer a higher energy density and are seen as promising alternatives. The new zinc-air battery created by the researchers is flexible, portable, and durable, making it suitable for use by consumers, as well as military and defense personnel operating in challenging environments. This technology offers a sustainable and reliable energy solution for remote areas, enabling energy independence in harsh climates.**

DNA Traces of Cattle Virus Found in Humans

- **Scientists at CSIR-NEERI found traces of the Lumpy Skin Disease Virus (LSDV), which typically affects cattle, in human respiratory samples. This discovery raises concerns about possible transmission from animals to humans. Researchers call for further investigation to understand the risks and protect public health, especially in areas where humans and livestock are in close contact.**

Image Source: link.springer.com
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Image Source: cimap.res.in

CSIR-CIMAP technology enabled NRDC transfer the Biodegradable Sanitary Napkin Technology to masses

- The National Research Development Corporation (NRDC) transferred its biodegradable, herbal sanitary napkin technology, developed by CSIR-CIMAP, to SS Creations (Femigiene). The agreement was signed by NRDC CMD Cmde Amit Rastogi (retd.), CSIR-CIMAP director Dr. Prabodh Kumar Trivedi, and entrepreneur Tanuja Bhatnagar.
- The technology offers eco-friendly, safe, and low-cost sanitary napkin named NAARI which is made from plant extracts, aloe vera, and essential oils, aiming to improve menstrual hygiene and support sustainable development.

CSIR-IICT Develops Indigenous Process for Key Rocket and Missile Propellant Material

- CSIR-Indian Institute of Chemical Technology (IICT) and Premier Explosives Ltd. have developed a cost-effective, eco-friendly process to produce TAIW, a key material for CL-20 propellant used in rockets and missiles. Led by chief scientist N. Lingaiah, the IICT team created a catalytic process with low-cost, accessible catalysts, reducing India's dependency on imports. This technology supports self-sufficiency in propellant production for missile and space applications and was officially transferred to Premier Explosives Ltd.

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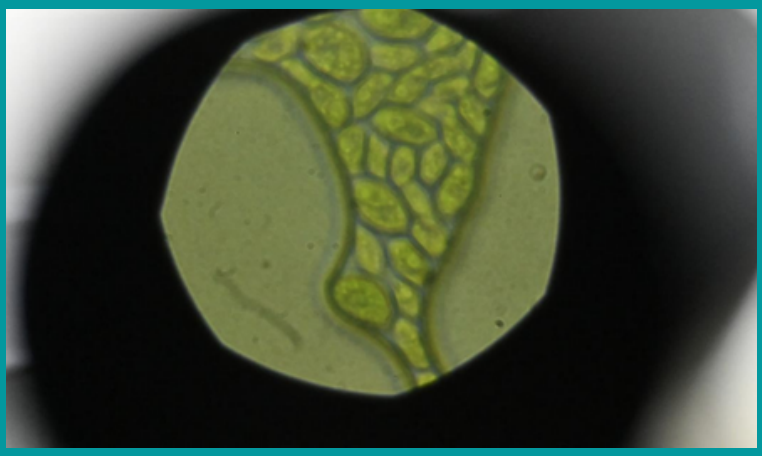

Image Source: csir.res.in

CSIR-IICT Highlights Potential of Chlorella Growth Factor for Food and Feed

- **Scientists at CSIR-Indian Institute of Chemical Technology (IICT) have found that Chlorella Growth Factor (CGF), a protein-rich extract from the microalgae Chlorella sorokiniana, is a promising ingredient for food and feed.**
- **Unlike traditional crops, microalgae don't compete for space and resources.**
- **Research shows that CGF, rich in essential amino acids and high-quality protein, can enhance human and animal diets.**
- **CGF, produced during photosynthesis and extracted without chemicals, has improved egg quality in poultry diets.**
- **The study highlights the importance of optimizing microalgae cultivation to meet the demand for high-quality protein. The findings are published in Algal Research.**

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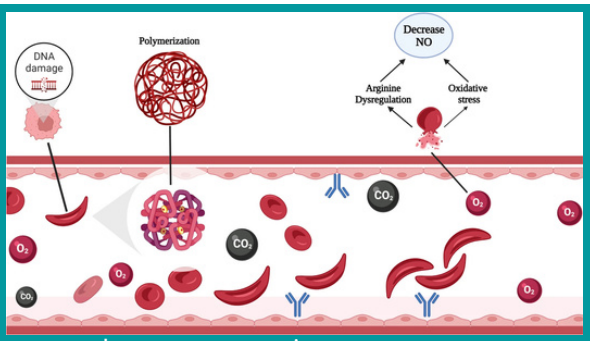

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India's Progress in Developing Gene Therapy for Sickle Cell Disease

India has made remarkable strides in developing gene therapy for sickle cell disease, a condition particularly prevalent among the country's Scheduled Tribes. Leveraging the advanced gene-editing tool CRISPR-Cas9, Indian researchers are optimistic about achieving positive laboratory results by January 2025, with the goal of beginning patient treatments within the following year. This progress was highlighted during a national conclave organized by the Tribal Affairs Ministry and the Birsa Munda Centre at AIIMS, where officials such as Vibhu Nayyar and M. Srinivas stressed the importance of close coordination with grassroots healthcare workers, including ASHAs and Anganwadi workers, to ensure effective implementation.

The Council of Scientific and Industrial Research–Institute of Genomics and Integrative Biology (CSIR-IGIB) is leading the testing and trials, moving towards patient trials in the wake of the U.S. FDA's approval of CRISPR-Cas9 for sickle cell disease in December 2023. However, a significant challenge remains in making this cutting-edge therapy affordable for widespread use.

The mission to eradicate sickle cell disease was launched by Prime Minister Narendra Modi in July 2023, aiming for complete eradication by 2047. The initiative involves screening over 70 million people from vulnerable tribal populations across 17 states and union territories, with 30 million screenings already completed. The CRISPR-Cas9 system, which uses an enzyme to cut DNA at precise locations and a guide RNA to insert modified genetic code, is central to this mission due to its speed and versatility.

Union Tribal Affairs Minister Jual Oram has underscored the critical role of grassroots healthcare workers in the success of this mission. The recent conclave brought together representatives from nearly 350 district centers to discuss strategies for recognizing, screening, and managing sickle cell disease. Additionally, efforts are underway to develop Ayurvedic formulations such as AYUSH-RP and AYUSH-SC3 for disease management, with ongoing testing by the Central Council for Research in Ayurvedic Sciences and the Indian Council of Medical Research. This multi-pronged approach reflects India's commitment to leveraging both modern science and traditional medicine in the fight against sickle cell disease.

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Image Source: csir.res.in

CSIR-NIO Transfers Microbial Technology for Better Aquaculture

- The Council of Scientific and Industrial Research - National Institute of Oceanography (CSIR-NIO) has transferred its new microbial consortia technology to MSortia LLP, a startup from Cochin University of Science and Technology. This technology, developed by CSIR-NIO, helps treat wastewater in aquaculture, improving the health of aquatic animals.
- The agreement was signed on June 24, 2024, by Prof. Sunil Kumar Singh of CSIR-NIO and Dr. Vrinda S of MSortia LLP during the One Week One Theme program of CSIR. The event featured key officials, including Dr. Jitendra Singh, Minister of Science and Technology, and Dr. N. Kalaiselvi, Director General of CSIR.
- The technology uses a special mix of marine bacteria to clean waste in aquaculture ponds, tested successfully in shrimp ponds in Kerala, Karnataka, and Gujarat. This development promises healthier and more sustainable aquaculture practices, benefiting the industry.

CSIR-CCMB develops cost-effective, non-invasive method to detect breast cancer

- Scientists at the CSIR-Centre for Cellular and Molecular Biology (CCMB), in collaboration with the Regional Cancer Centre (RCC) in Thiruvananthapuram, have developed a cost-effective, non-invasive method to detect breast cancer from a drop of blood.
- By analyzing microRNA (miRNA) signatures in cancer samples, researchers identified 439 miRNAs linked to invasive breast cancer, with 107 potential biomarkers for different types and stages of the disease. These miRNAs can regulate cancer development, making them useful for early diagnosis and prognosis.
- Cancer cells release DNA/RNA into the blood, which can be detected to identify early cancer stages. This method could lead to a liquid biopsy system, providing a quick, affordable, and non-invasive breast cancer detection method, especially beneficial in developing countries.
- Nine international patents have been granted for these biomarkers, and the research was published in the journal "Cell Communication and Signalling."

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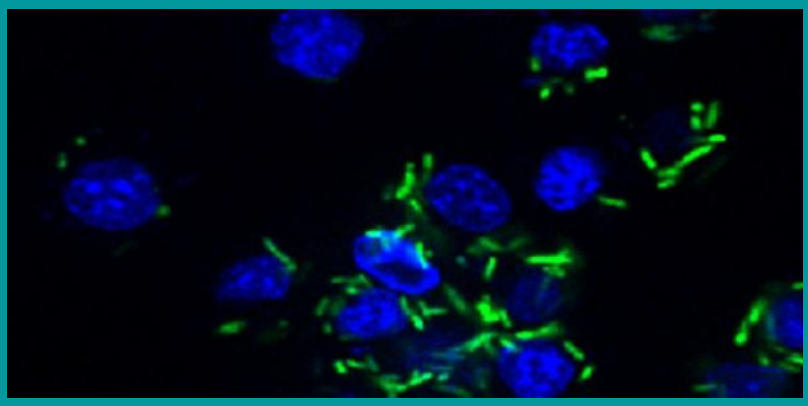

Image Source: jicb.res.in

Dengue Antibodies Might Protect Against COVID-19, Study Suggests

- **Researchers from the CSIR-Indian Institute of Chemical Biology in Kolkata found that antibodies from dengue infections might help neutralize certain coronaviruses. This could explain why countries with endemic dengue had fewer severe COVID-19 cases early in the pandemic compared to regions like Europe and North America.**
- **The study showed that dengue antibodies could block the coronavirus from entering cells, though this effect might not apply to all variants. Despite this potential cross-protection, dengue and coronaviruses are different, and infection with one doesn't usually protect against the other.**
- **During the pandemic, India saw a significant decline in dengue cases, possibly due to lockdown measures. More research is needed to understand the relationship between dengue antibodies and COVID-19 severity.**

Edition: 01-05 August 2024

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CSIR-NGRI: study shows accelerating groundwater depletion in North India

- A new study reveals that groundwater depletion in North India has been rapidly accelerating over the past 70 years, posing a significant threat to water and food security for over a billion people. The research, conducted by a team of scientists from CSIR-NGRI, NEIST, IIT Gandhinagar, Columbia University, and King Abdullah University, was published in the journal Earth's Future.

Key findings include:

- Rapid Groundwater Depletion: From 2002 to 2021, more than 450 km³ of groundwater was lost, with depletion rates exceeding 1.5 cm/year.
- Impact of Climate Change: The decline is attributed to reduced summer monsoon rains and warmer winters, leading to increased irrigation needs and reduced groundwater recharge.
- Projected Future: In the future, both warmer climates and monsoon changes are expected to raise irrigation demands by 6-20%, further depleting groundwater reserves.
- The study emphasizes the urgent need for groundwater sustainability measures such as altering crop patterns, improving irrigation efficiency, and recharging groundwater to mitigate the impacts of climate change and ensure future water and food security.

CSIR-CMERI Develops Battery for Sub-Zero Energy Solutions

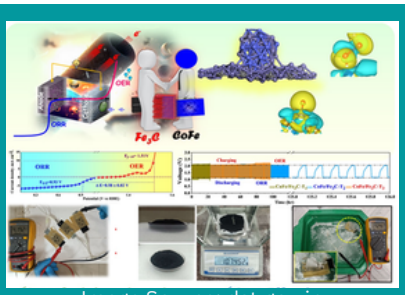

Image Source: dst.gov.in

- CSIR experts have developed a zinc-air battery that works efficiently in sub-zero temperatures, benefiting the military and civilians in high-altitude areas.
- The battery uses a durable cathode catalyst and anti-freezing electrolyte, making it reliable in extreme cold.
- The lightweight and portable device provides a practical energy solution for both everyday users and defense personnel.
- This advancement offers a sustainable, resilient alternative to traditional batteries, helping meet the growing demand for efficient, renewable energy systems.

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Image Source: nbri.res.in

CSIR-NBRI creates herbal remedy to alleviate gout symptoms in the elderly

- The CSIR-National Botanical Research Institute (NBRI) in Lucknow has developed a new herbal supplement called 'NBRI-Gout Out' for elderly individuals suffering from gout. This plant-based remedy combines five medicinal plants and aims to improve symptoms like joint pain and stiffness.
- Funded by the Department of Science and Technology, the supplement has shown significant efficacy in reducing uric acid levels by 80% and inflammatory mediators by nearly 70% in laboratory tests. It is water-soluble, cost-effective, and does not threaten biodiversity, with two companies interested in commercialization.
- Unlike many existing herbal products lacking scientific validation, NBRI-Gout Out can also be used alongside standard treatments for gout and gouty arthritis.

CSIR-IIIM Study Uncovers Therapeutic Potential of Compounds from Ashwagandha Fungi

- CSIR-Indian Institute of Integrative Medicine conducted a study on Withania somnifera (Ashwagandha) and its associated microorganisms, focusing on fungi. The research identified Aspergillus aculeatus S20, a fungus producing the indole alkaloid okaramine H, known for its insecticidal properties.
- This is the first study to explore okaramine H's potential against the Leishmania donovani parasite, which causes leishmaniasis, showing inhibitory effects.
- The findings underscore the importance of medicinal plants and their microorganisms in drug discovery, opening new possibilities for developing treatments for diseases like leishmaniasis.

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Image Source: csir.res.in

CSIR-IMTECH Develops Indigenous Covid Vaccine with Near-Complete Protection

- **Researchers at CSIR-Institute of Microbial Technology (IMTECH), Chandigarh, have developed a protein subunit-based Covid-19 vaccine, IMT-CVAX, offering "near-complete protection" in preclinical trials.**
- **Unlike mRNA and viral vector vaccines, IMT-CVAX is based on a recombinant spike protein, proven effective in neutralizing variants such as Delta.**
- **The vaccine showed robust immune responses in mice and hamsters, with no visible side effects, making it a promising candidate for future SARS-CoV-2 infections.**
- **The study, published in Vaccine, highlights the vaccine's potential for mass immunization due to its ease of production and storage.**
- **Funded by CSIR, the project aims to establish an indigenous platform for rapid vaccine development.**

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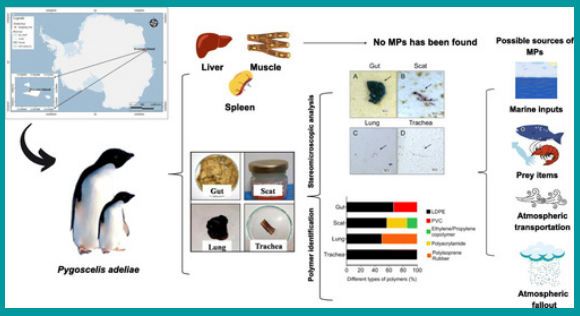

Image Source: sciencedirect.com

CSIR-NIO Study Finds Microplastics in Antarctic Penguins, Highlighting Environmental Threat

- **Scientists from various institutions, including CSIR-National Institute of Oceanography, have confirmed the presence of microplastics in the gastrointestinal tracts of Adelie penguins in Antarctica. Published in Science of the Total Environment, the study is the first to comprehensively examine microplastics across different tissue types in these penguins.**
- **The most common microplastic found was low-density polyethylene (LDPE).**
- **The findings highlight the growing threat of microplastic hotspots in Antarctic ecosystems, emphasizing the need for urgent research and mitigation efforts to protect wildlife.**

FSSAI and CSIR-IITR Launch Project to Tackle Microplastic Contamination in Indian Foods

Image Source: ddnews.gov.in

- **The Food Safety and Standards Authority of India (FSSAI) has launched a project to detect microplastics in food and assess their prevalence in India. Microplastics, tiny plastic particles found in various environments, pose a significant health risk.**
- **The project, initiated in March, aims to develop methods for micro/nano-plastic detection and generate data on exposure levels.**
- **Collaborating with research institutions like CSIR-Indian Institute of Toxicology Research, FSSAI hopes the findings will inform regulations and contribute to global efforts to combat microplastic contamination.**

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Image Source: pubs.rsc.org

CSIR-IICT Develops Innovative Catalyst for Green Hydrogen Production

- **Scientists at CSIR-Indian Institute of Chemical Technology (IICT) have developed a new catalyst, cobalt(III) based bis-terpyridine, for producing "Green Hydrogen" using sunlight. This catalyst harnesses solar energy in a photo-electro-chemical system to split water molecules, generating hydrogen gas. The technology could make hydrogen production more affordable and scalable, offering a cleaner alternative to fossil fuels. The study, led by Malapaka Chandrasekharam and team, was published in Sciencedirect Next Energy. This breakthrough could pave the way for sustainable hydrogen energy in the future.**

CSIR-CLRI Innovates Fertilizer Production from Animal Hair

- **Scientists at the Central Leather Research Institute (CLRI) in Chennai have developed a method to convert animal hair, a waste product from tanneries, into a nutrient-rich fertilizer. Hair contains keratin, which is beneficial for plant growth. The process involves washing the hair and using a novel bacterial strain to hydrolyze it, resulting in liquid keratin hydrolysate. This hydrolysate is then turned into organic compost and a powdered organic supplement for agriculture.**
- **This innovative technology not only provides a sustainable fertilizer option but also addresses pollution from the leather industry, which produces around 40,000 tonnes of hair waste annually. Testing by the National Agro Foundation showed improved crop yields in paddy fields treated with the compost, indicating its effectiveness.**

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Image Source: iim.res.in

CSIR-IIIM: New Mutation in Saffron Gene Enhances Growth and Resilience

- **Researchers at the CSIR Indian Institute of Integrative Medicine have introduced a mutation in the lycopene-β-cyclase enzyme (CstLcyB2a) of Crocus sativus (saffron), improving the production of valuable compounds like crocin. The A126 mutation increases β-carotene formation, enhancing saffron's color and flavor.**
- **This mutation boosts phytohormones essential for growth and improves the plants' photosynthetic efficiency. Transgenic Nicotiana tabacum plants with this mutation showed better growth, while manipulating hormone levels positively impacted biomass production. This research advances our understanding of carotenoid biosynthesis and aims to develop crops with improved quality and resilience.**

CSIR-NIO Study: Antibiotic-Resistant Bacteria in Mandovi and Zuari Estuaries

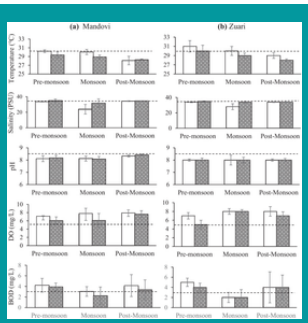

Image Source: link.springer.com

- **A National Institute of Oceanography (NIO) study found high levels of antibiotic-resistant bacteria in the Mandovi and Zuari estuaries, raising public health concerns.**
- **Some bacteria showed resistance to up to 15 antibiotics, with a high Multiple Antibiotic Resistance (MAR) index of 0.94.**
- **The study highlighted that monsoon rains improved water quality but also introduced harmful pathogens from land runoff.**
- **Overall, the Water Quality Index (WQI) was "poor" outside the monsoon season.**
- **Researchers stress the need for improved urban planning and waste management to address these issues and protect the estuarine ecosystem.**

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Image Source: nature.com

CSIR-IGIB: Engineered Proteins for Safer Gene Therapies

- **Researchers at the CSIR-Institute of Genomics and Integrative Biology in Delhi and the University of Tokyo have developed enhanced Cas9 variants (enFnCas9) that improve gene editing efficiency by about 3.5 times. These new variants can effectively correct a mutation linked to Leber congenital amaurosis type 2 (LCA2), a genetic eye disorder causing childhood blindness.**
- **The modifications enhance PAM binding and kinetic activity while maintaining specificity. Testing on patient-specific stem cells showed that enFnCas9 successfully restored the RPE65 gene's normal sequence, allowing the production of functional RPE65 protein. Future research aims to optimize these variants for wider use in diagnostics and therapeutics.**

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Image Source: educationtimes.com
This is only a representative image from the source mentioned.

CRRI and IRC's Initiative to Improve Road Safety for School Children

- The Central Road Research Institute (CRRI) and Indian Road Congress (IRC) have launched a joint initiative to enhance road safety for school children.
- The plan involves creating safe zones around schools with better traffic management infrastructure, including special zebra crossings, speed limits, and visible signage.
- Roads near schools will have white-and-red zebra crossings and large "School" markings to warn drivers.
- The initiative also requires speed limits of 25 km/h on main roads and 20 km/h on internal roads, along with regular checks on school buses and drivers' fitness.

Surge in Antibiotic-Resistant Genes in Winter Wastewater

- A study by CSIR-Indian Institute of Chemical Technology reveals a rise in antibiotic-resistant genes in urban wastewater during winter.
- Researchers analyzed samples in Hyderabad, detecting resistance to major antibiotics like beta-lactam and tetracycline.
- The increase in resistance genes, which help bacteria evade antibiotics, peaks in winter and drops by summer.
- Wastewater analysis could help clinicians select effective antibiotics and detect pathogen outbreaks.

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Extract from 'CSIR Matters' (Edition 01-05 September 2024)

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Image Source: ccmb.res.in

CSIR-CCMB's Breakthrough Sickle Cell Anaemia Test Set to Make Widespread Impact

- **A team of scientists at the CSIR-Centre for Cellular & Molecular Biology (CSIR-CCMB) has developed an affordable, accurate, and rapid molecular test for screening sickle cell anaemia (SCA). This test, validated by the Indian Council of Medical Research (ICMR), boasts 100% sensitivity and specificity, and costs ₹100 or less. It can screen individuals with just a drop of blood and provides results for whether a person is normal, a carrier, or has SCA.**
- **Unlike current tests, this PCR-based method eliminates the need for extensive blood collection and allows for prenatal diagnosis and genetic counseling. It has demonstrated over 99.6% accuracy when compared to traditional HPLC-based tests.**
- **The project aims to address the significant prevalence of SCA, especially among tribal populations in India. So far, up to 30 lakh people have been screened in states like Chhattisgarh, Maharashtra, Madhya Pradesh, and Rajasthan. The goal is to expand these screening efforts by establishing more PCR centers and training personnel.**

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Image Source: hindustantimes.com

CSIR-CIMAP Develops Fennel Oil-Infused Polymeric Beads to Combat Mosquito Larvae

- **Scientists from various institutions, including CSIR-National Institute of Oceanography, have confirmed the presence of microplastics in the gastrointestinal tracts of Adelie penguins in Antarctica.**
- **Published in Science of the Total Environment, the study is the first to comprehensively examine microplastics across different tissue types in these penguins.**
- **The most common microplastic found was low-density polyethylene (LDPE).**
- **The findings highlight the growing threat of microplastic hotspots in Antarctic ecosystems, emphasizing the need for urgent research and mitigation efforts to protect wildlife.**

CSIR-NIO Unveils Breakthrough Technology: Converting Plastic into Biodiesel for Environmental Protection

- **CSIR-NIO has developed a new technology to tackle plastic pollution, depleting petroleum reserves, and global warming by converting plastics into biodiesel using marine bacteria.**
- **The system, designed by Senior Scientist Abhay B Fulke, uses the bacteria Pseudomonas mendocina to degrade plastics, producing CO2 that supports microalgal growth.**
- **The algae are then used to produce biodiesel.**
- **This integrated bioreactor system has shown 16.67% to 19.17% plastic conversion into microalgal biomass for biodiesel production, with potential for higher efficiency in larger systems. The innovation offers a sustainable alternative to fossil fuels.**

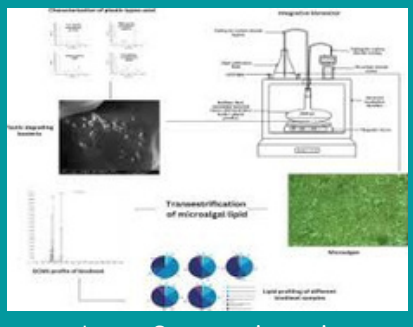

Image Source: nio.res.in

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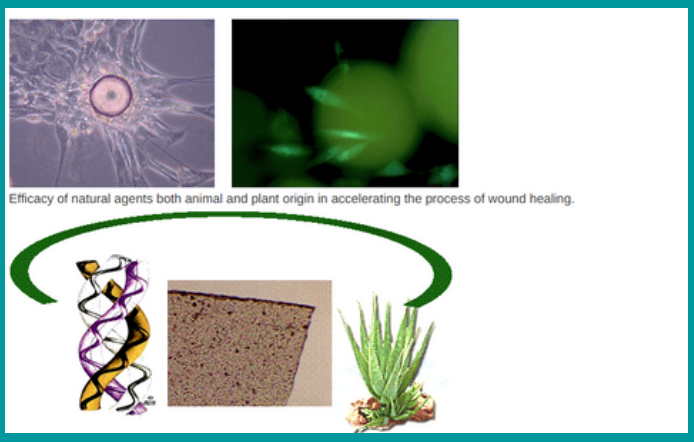

Image Source: clri.org

CSIR-CLRI Advances Nanozyme Technology for Improved Collagen-Based Biomaterials

- The CSIR-Central Drug Research Institute (CDRI) has discovered that targeting the protein sclerostin may help treat osteoporosis linked to chronic kidney disease (CKD). After five years of research, CDRI has partnered with Zydus Lifesciences Ltd to create effective therapies for CKD patients facing osteoporosis and fractures.
- CDRI director Radha Rangarajan noted that CKD disrupts mineral metabolism, increasing fracture risk, especially in women over 65. Most conventional osteoporosis medications are not suitable for CKD patients, highlighting the need for safe alternatives.
- The collaboration aims to develop oral medications by discovering small molecule inhibitors of sclerostin, addressing unmet medical needs in India through innovative therapies.

CSIR-NIO Study Uncovers Microplastic Pollution on Goa's Coast

- A decade-long study by the CSIR-National Institute of Oceanography (NIO) has revealed significant microplastic pollution along Goa's coast. Initiated in 2013-14 with support from state and central governments, the research, led by Dr. Mahua Saha, involves collecting samples from littered beaches to assess the impact of microplastics.
- CSIR director Dr. Sunil Kumar Singh highlighted the concern that microplastics from rivers and the sea are entering the food chain, affecting human health. The NIO has established the country's first laboratory dedicated to microplastic research, focusing on identifying plastic sources and their environmental effects. Dr. Saha noted that the team's efforts include analyzing microplastics in seafood, crucial for Goa's fish-eating population. Dr. Ankit Yadav from the Science and Technology department stated ongoing efforts to reduce marine litter through improved waste management policies.

Image Source: nio.res.in

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Image Source: ccmb.res.in

CSIR-CCMB Builds Advanced Animal BSL-3 Facility to Combat Infectious Diseases

- **CSIR-Centre for Cellular & Molecular Biology (CCMB) is constructing a dedicated 6,000 sq. ft. Animal BSL-3 facility to enhance research on infectious diseases among animals, funded by the Department of Science and Technology. This advanced biosafety lab will enable scientists to conduct animal-based infection studies to test vaccines and drugs for future pathogens.**
- **The facility, divided for virus and bacterial work, is airtight, equipped with negative pressure, HEPA filters, and strict SOPs for safety. Only authorized personnel can access it, and waste is sterilized on-site. Once operational, all projects will undergo review by the Institutional Bio-Safety Committee and the RCGM. CCMB aims to maintain the highest safety standards to protect public health.**

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Image Source: niist.res.in

CSIR-NIIST Partners with Tata Steel for Carbon Reduction and Launches Sustainable Leather Alternative

- **CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) has partnered with Tata Steel Limited (TSL) to evaluate ceramic sorbents for reducing carbon emissions as part of the CSIR's Carbon Capture, Utilisation, and Storage (CCUS) mission.**
- **The MoU was exchanged during NIIST's Foundation Day.**
- **Additionally, NIIST transferred technology for converting groundnut shells and corn husks into eco-friendly leather alternatives to Leafy Leather Pvt Ltd, a Surat-based start-up.**
- **This initiative addresses waste management and offers a sustainable alternative to traditional and synthetic leather, with applications across fashion and automotive industries.**

CSIR-CCMB Develops MicroRNA-Based Blood Test for Early Breast Cancer Detection

Image Source: deccanchronicle.com

- **Dr. Lekha Dinesh Kumar and her team at CSIR-CCMB are leveraging microRNAs for early detection of Invasive Ductal Carcinoma (IDC), the most common type of breast cancer.**
- **The study identified 107 microRNAs as potential biomarkers from a total of 439 associated with breast cancer, aiding in identifying cancer types, grades, and stages.**
- **Their patented technology allows breast cancer detection from a single drop of blood, offering a non-invasive alternative to mammograms, particularly beneficial for rural areas.**
- **CCMB has licensed the research to Zeroharm Sciences to develop a "plug-and-play" diagnostic device. Additionally, CCMB is exploring RNA-based biodrugs for colon cancer, expanding their impact on cancer diagnostics and treatment.**

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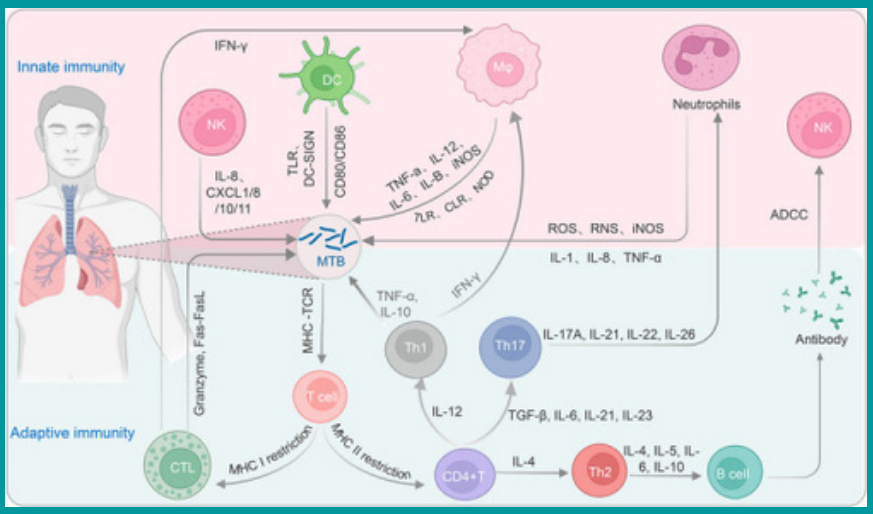

Image Source: pmc.ncbi.nlm.nih.gov

New Insights into TB Bacteria's Immune Evasion and Treatment Potential

- **Tuberculosis (TB) remains a major challenge in India due to Mycobacterium tuberculosis (Mtb)'s growing resistance to antibiotics. Researchers are now focusing on understanding Mtb's survival strategies within the immune system, particularly its ability to thrive in macrophages – immune cells meant to destroy foreign invaders.**
- **Mtb can survive oxidative stress within macrophages by forming protective clusters called tubercles and producing antioxidants, aided by specific enzymes like cysteine synthases. A recent study by CSIR-CCMB in Hyderabad identified that cysteine synthase enzymes, particularly CysK2 and CysM, help Mtb survive during nutrient deficiency and stress by producing antioxidants. By inhibiting these enzymes, researchers found that common TB drugs like isoniazid became more potent, offering new avenues for treatment.**
- **Additionally, global studies are investigating Mtb's resilience mechanisms, including how it influences macrophage memory and immune responses. These insights could pave the way for new treatments, though further studies on human cells are essential for translating these findings into clinical applications.**

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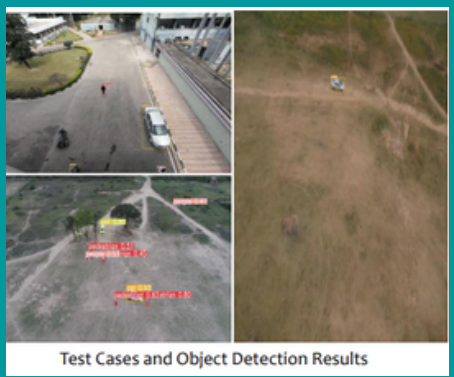
Image Source: punekarnews.in

Researchers at IISER and NCL Pune Uncover Key Role of Structural Defects in Amorphous Solid Deformation

- Researchers at IISER Pune and CSIR-NCL Pune have revealed that the deformation of amorphous solids, like colloidal glasses, is influenced by structural defects within the material.
- Using advanced microscopy, Dr. Vijayakumar Chikkadi and Dr. Sarika Bhattacharyya's team tracked particle movement in dense colloidal suspensions, showing that localized deformations occur in defect-rich regions when stress is applied.
- This work, published in Proceedings of the National Academy of Sciences USA, could improve models for materials such as granular substances, emulsions, and metallic glasses.

CSIR-CSIO Develops Drone-Mounted Software for Automatic Object Detection



Test Cases and Object Detection Results

Image Source: csio.res.in

- In a first-of-its-kind innovation in India, CSIR-CSIO has developed a software framework for drones to automatically detect and locate objects like humans, bunkers, and tanks from aerial images.
- This "Vision-based Target Detection and Localisation" system, completed in two years, enhances UAV capabilities for defense, disaster management, and surveying.
- Transferred to L&T Mumbai for commercial production, the software uses GPS to achieve precise object positioning with less than a meter error from 250 meters up.
- Adaptable to various drones, it also supports night vision for use in low-light conditions.

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In this issue:

Image Source: defence.in

Image Source:HindustanTimes

CSIR-NCL Boosts Oxygen Generation System in Indian Navy MiG-29 Jets

- **The CSIR-National Chemical Laboratory (CSIR-NCL) in Pune has enhanced the On-Board Oxygen Generation System (OBOGS) for MiG-29 fighter jets used by the Indian Navy, increasing oxygen output from 30% to 85% for high-altitude missions.**
- **Led by Dr. Vijay Bokade and Dr. Prashant Niphadkar, the team developed a rejuvenation process for zeolite materials in the system, which absorb nitrogen to produce pure oxygen.**
- **After successful testing in Goa, this upgrade is now supporting Navy missions. CSIR-NCL has also developed technology for synthesizing oxygen-enriching zeolites to further sustain the system's performance.**

CSIR Develops Device for Health Diagnostics and Adulteration Testing

Image Source: csir.res.in

- **CSIR institutions have developed "FluoriPCR," an affordable, portable device for health diagnostics and food safety testing.**
- **Created by CSIR-IITR and CSIR-CEERI, FluoriPCR combines four machines used for biochemical and molecular testing, significantly lowering costs from ₹35 lakh to ₹1-1.5 lakh.**
- **It identifies meat authenticity, detects contamination, and can also test for DNA-based adulteration in foods like wheat and pulses, as well as for bacteria, viruses, and allergens.**
- **The NABL-certified device is customizable and available for technology transfer to interested industries, research institutions, and diagnostic labs.**

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Image Source: cftri.res.in

CSIR-CFTRI Unveils New Range of Industry-Ready Food Products

- **CSIR-CFTRI has developed a range of innovative food products for industry use, including a probiotic carrot nectar, gluten-free bread premix, multigrain waffles, and instant masala tea premix.**
- **The probiotic carrot nectar, developed by Aditi Goel, meets over 50% of daily Vitamin A needs.**
- **The gluten-free bread premix, led by Dr. P. Prabhasankar, uses millet for a nutritious option targeting bakeries. Multigrain waffles, with higher fiber and lower calories, cater to health-conscious consumers, and the instant masala tea premix offers a quick, customizable beverage option.**
- **These products support public health and sustainability goals.**

Hyderabad Researchers Contribute to India's First Breast Cancer Genomic Atlas

- **Researchers from Hyderabad, including those from CSIR's Centre for Cellular and Molecular Biology (CCMB), are part of India's first initiative to create a Breast Cancer Genomic Atlas.**
- **This project involves profiling nearly 1,000 breast cancer tumors to develop India-specific genomic resources.**
- **With contributions from 50 doctors, 35 scientists, and 12 hospitals, the project aims to produce over 400 terabytes of data, aiding in better clinical management for Indian patients.**
- **'Atlas' is expected to benefit 20% of humanity, will expand to other cancers as data infrastructure scales up.**

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Image source: timesofindia.indiatimes.com
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CSIR-NIO Found Microplastics in Antarctic Penguins

- **A recent study led by Dr. Mahua Saha of CSIR-National Institute of Oceanography (NIO Goa) revealed alarming evidence of microplastics in the organs and tissues of Adelie penguins from Antarctica's Svenner Island. These tiny plastic particles, mostly fibres from clothing and fishing gear, were found in the gastrointestinal and respiratory tracts of penguins, posing severe health risks.**
- **The study, conducted during the 39th Indian expedition to Antarctica, showed 97% of identified microplastics were fibres, with over half being blue, likely from fishing nets or clothes. Penguins ingest these plastics mistaking them for food, potentially passing toxins to their chicks via crop milk.**
- **This pollution affects the entire food web as penguins' primary prey, like krill and fish, also contain microplastics. The findings highlight the urgent need for stricter plastic regulations and conservation efforts to protect wildlife and the planet's most remote regions.**

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Image Source: hindustantimes.com

CSIR-NCL's Silk-Based Medical Innovations by Serigen Mediproducts

Anuya Nisal, after earning a Master's in Material Science from the University of Delaware, returned to India to contribute to its scientific ecosystem. During her PhD at CSIR-NCL, she discovered silk's potential as a biocompatible, biodegradable material for medical use. This led to the founding of Serigen Mediproducts in 2015 with Dr. Swati Shukla and Dr. Premnath Venugopalan.

Serigen develops innovative silk-based medical devices, including:

- **Serioss: A bone void filler that dissolves over time, promoting new bone growth.**
- **Seriderm: A non-adherent wound dressing aiding faster wound healing by maintaining optimal moisture levels.**
- **Serimat: A support material for breast reconstruction surgeries.**

With support from government grants, angel investors, and a dedicated manufacturing facility in Pune, Serigen has advanced clinical trials for its products and established a national sales team. Their silk-based technology, protected by multiple patents, offers versatile solutions for tissue regeneration, aiming to improve patient care globally.

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CSIR-CLRI and Tata International Lead Sustainable Revolution with Phoenix Leather

- **The Indian leather industry generates significant waste, with over 50,000 tonnes of solid leather waste produced annually during the post-tanning process. To address this environmental challenge, Tata International collaborated with CSIR-Central Leather Research Institute (CLRI) to develop Phoenix Leather—a high-quality regenerated leather made from post-tanning waste such as shaving waste and buffing dust.**
- **The innovative process involves pulverizing waste into powder, forming a liquid mixture with biopolymers and plasticizers, and drying it into durable sheets. The resulting material, nearly indistinguishable from real leather, retains 80% of leather's mechanical properties and can be enhanced further.**
- **Phoenix Leather is eco-friendly and targets sustainability-conscious consumers, suitable for making shoes, bags, garments, and upholstery. With potential to generate 2 billion sq.ft., of regenerated leather annually, this initiative aims to reduce waste and meet the demand for recycled materials in the leather supply chain.**

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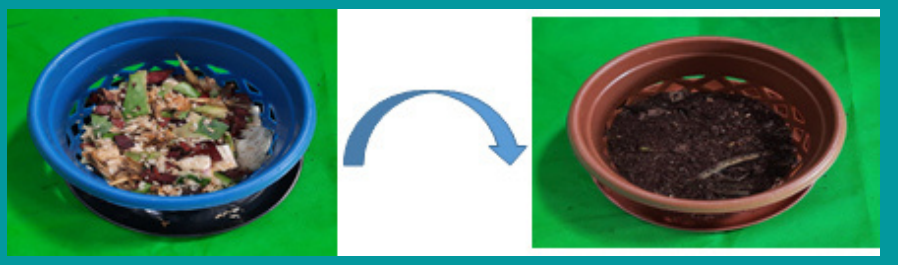

Image Source : niist.res.in

CSIR-NIIST Unveils Jaivam: A Breakthrough in Eco-friendly Waste Management

- CSIR-NIIST has developed 'Jaivam,' a microbial consortium designed to revolutionize waste management by enabling faster, eco-friendly composting for agricultural use.
- Partnering with Agso Agrosoldier Pvt Ltd, the institute has granted a non-exclusive license for its commercial production.
- 'Jaivam' enhances compost quality, reduces greenhouse gas emissions, and accelerates composting processes, benefiting both decentralized and centralized systems.
- Field trials confirm its potential for efficient waste processing.

CSIR-CFTRI's Sustainable Innovations in Food Technology

The CSIR-Central Food Technological Research Institute (CFTRI) in Mysuru has developed biodegradable plates using by-products from millet processing under the 'SHREE ANNA – the Millet Mission.' This eco-friendly initiative aims to reduce plastic waste and aligns with India's focus on sustainability. During its 75th Foundation Day, CFTRI showcased these plates in a trial run, with plans to develop edible tableware for the future.

CFTRI also introduced other innovative food technologies, including:

- Multigrain Waffles: Low-calorie, fibre-rich waffles combining whole wheat and millet flours.
- Instant Masala Tea Premix: Convenient sachets offering traditional flavours with varied sweetener options.
- Gluten-Free Bread Premixes: Made from minor millets, catering to gluten-intolerant individuals and promoting millet consumption.

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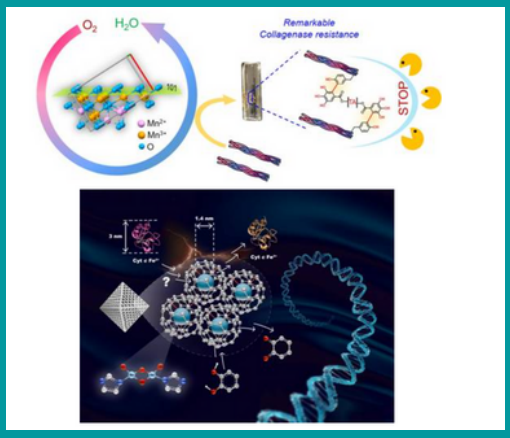

Image Source : dst.gov.in

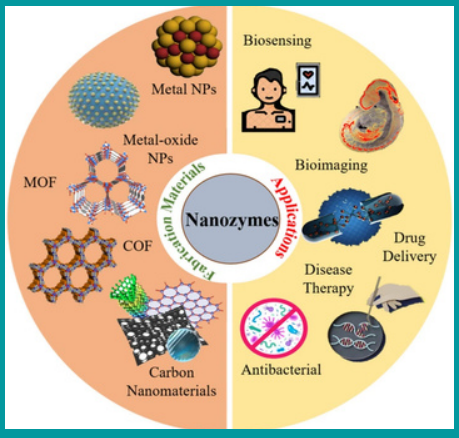

Image Source :link.springer.com

This is only a representative image from the sources mentioned.

Nanozymes Revolutionize Biomaterials for Biomedical Applications

- **Researchers from CSIR-CLRI, supported by DST fellowships, are advancing the role of nanozymes in transforming biomaterials for medicinal use. They demonstrated how manganese-based oxidase nanozymes (MnN) enable collagen crosslinking, enhancing its resistance to degradation while retaining its structure.**
- **Another study designed a di-copper active site within MOF-808 to mimic enzyme binding pockets, addressing challenges in nanozyme selectivity and efficiency. These findings, published in Chemical Science, broaden nanozyme applications to include complex biological molecules like collagen, paving the way for durable, stable biomaterials in therapeutic contexts.**

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Image source: csio.res.in/upload

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CSIR-CSIO develops high powered aspheric lens based spectacles the Low Vision Aids (LVA)

- **The Central Scientific Instruments Organisation (CSIO), Chandigarh, has developed innovative Low Vision Aids (LVAs) having high-powered aspheric lenses to assist those with severe or functional low vision (FLV). These lenses, are 60 % lighter and more powerful than conventional ones, offering better optical performance with reduced aberrations. Available in various power combinations (12 D, 16 D, 20 D, and 26 D), they can be customized to individual needs.**
- **Launched at the National Awards for Empowering Divyangjans 2024, the LVAs were designed to be compact and lightweight, ideal for children. With FLV affecting over 1.4 crore people in India, CSIO's LVAs, made using precision diamond turning techniques, are expected to enhance accessibility. Plans are underway to scale production through moulding techniques for faster distribution, with pricing currently being finalized.**

'Made in India paracetamol to hit market next year'

- **The Council of Scientific and Industrial Research (CSIR) has developed an innovative technology to manufacture paracetamol domestically, reducing India's reliance on imports. Currently, India imports raw materials for paracetamol from various countries. But with CSIR's new, cost-effective process, Karnataka-based Satya Deeptha Pharmaceuticals Ltd will soon begin production. This breakthrough will enable India to produce more affordable and effective paracetamol, contributing to the country's self-reliance in the pharmaceutical sector.**
- **Council of Scientific and Industrial Research has been transforming the industrial innovation landscape by reducing its reliance on China.**

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Extract from 'CSIR Matters' (Edition 01-05 December 2024)

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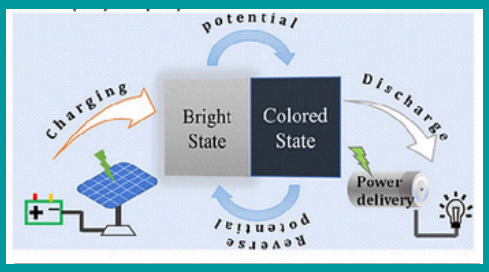

Image source: niist.res.in

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CSIR- NIIST Researchers Develop 40% High-Efficiency Solar Cells for Indoor Applications

- **A team led by CSIR-NIIST has achieved a significant milestone in dye-sensitized solar cells (DSCs), for indoor photovoltaic (PV) applications. These solar cells are designed for powering devices like wireless sensors and IoT under indoor light conditions.**
- **The innovation involves a starburst triphenylamine dye (RJ-C6) combined with XY1b dye and a dual-species copper(II/I) electrolyte. This combination enhances light absorption, dye loading, and stability, achieving efficient molecular packing and reducing electron recombination. These advancements allow for better dye loading, improved light absorption, and reduced back electron transfer, resulting in a highly stable and efficient solar cell.**
- **The cells demonstrated impressive performance under indoor lighting conditions, achieving efficiencies of 35% at 100 lux, 37% at 1000 lux, and a record 40% at 4000 lux. Making them a strong candidate for powering indoor devices, with further potential to reduce environmental waste by replacing conventional batteries. The cells also showed promising stability, with no degradation after 800 hours of accelerated indoor testing.**
- **Plans are in place to move this technology beyond the lab, with ongoing field trials of battery-free, self-powered devices and research into building-integrated photovoltaics (BPIVs) for energy-efficient buildings. These developments could pave the way for more sustainable energy solutions in both indoor and outdoor PV applications.**

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Gene Mutation Linked to Autism: RGCB Study

- **A study by Dr. Jackson James and his team at the Rajiv Gandhi Centre for Biotechnology (RGCB) identified a mutation in the Tlx3 gene as a potential cause of autism. The mutation affects cerebellum development, leading to autistic behaviors such as impaired social skills, repetitive actions, and motor function abnormalities.**
- **Using transgenic mice, the researchers demonstrated that deleting the Tlx3 gene resulted in autism-like behaviors in adulthood.**
- **The RGCB team, in collaboration with CSIR IGIB (Council Of Scientific And Industrial Research Institute Of Genomics And Integrative Biology (CSIR IGIB), New Delhi, also assessed the potential for this mutation to occur in the human population and identified TLX 3 mutation variants that are linked to nine ASD cases and other co morbid neurodevelopmental conditions. The collaboration revealed TLX3 mutations in nine human autism cases.**

New Study Reveals Origins of Nicobarese People

- **A study by CCMB and BHU researchers challenges earlier beliefs about the origins of the Nicobarese. Using DNA analysis of 1,559 individuals, the study found that Nicobarese share significant ancestral ties with Austroasiatic populations across South and Southeast Asia and likely settled in the Nicobar Islands around 5,000 years ago, not 11,700 years ago as previously thought.**
- **The study also highlights genetic connections between the Nicobarese and the Htin Mal community of Southeast Asia, both key to understanding Austroasiatic heritage. Published in the European Journal of Human Genetics, the research underscores the need to preserve the cultural and genetic diversity of Indigenous populations.**

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Millet Excellence and Incubation Centre opens at CFTRI in Mysuru

Image source: starofmysore.com

- The Centre of Excellence for Millets and Incubation Centre was inaugurated at CSIR CFTRI, Mysuru, by the Minister for Agriculture, N. Cheluvarayaswamy, on Friday. The facility, developed with support from the Karnataka State Government, aims to advance millet-based innovations. The CSIR CFTRI Director Dr. Sridevi Annapurna Singh, MLAs Ramesh Bandisidde Gowda, K. Harish Gowda, and other dignitaries attended the inauguration.

- This centre is equipped with three units, with a combined production capacity ranging from 500 kg to 1 tonne. The CFTRI intends to train farmers and make them entrepreneurs in millet processing, empowering them to become self-sufficient in this growing sector.
- The institute has developed over 60 technologies over the past 17 years, with 12 new technologies introduced last year, focusing primarily on millet-based products. Notable innovations include ragi-based malt hydrolysates, ready-to-eat weaning food, multigrain waffles, multigrain pizza bases, and instant millet mixes such as idli, upma, puttu podi mix, and halwa. These products are designed for longer shelf life without compromising on taste and nutritional value.
- With India being the world's largest producer of millets, contributing 19% of global production, CFTRI is committed to promoting millets both domestically and internationally. The Centre of Excellence aims to transfer these technologies to farmers, entrepreneurs, and women's self-help groups (SHGs), enabling them to market millet-based products globally.
- The initiative is backed by a ₹20 crore investment from the Karnataka government and seeks to drive innovation and entrepreneurship in the millet industry.

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Image source: deccanchronicle.com

Ecofix Technology: A Game-Changer for Quick Road Repairs in Bengaluru

- Engineers of the Bruhat Bengaluru Mahanagara Palike (BBMP) praised the ECOFIX technology for road repairs during a live demonstration by CSIR-Central Road Research Institute (CRRI) on Avenue Road. This innovative steel slag-based technology, developed by Dr. Sanjay Pandey, Principal Scientist of CSIR CRRI and inventor of the
- ECOFIX technology carried out repair out a road repair demonstration on Avenue road and immediately after its repair, the road was opened for vehicular movement. ECOFIX technology is developed using industrial waste of steel industries (iron and steel) and has the unique ability to repair the to repair the water logged pothole without any dewatering management.

CSIR-IICT Licenses Tech for Compostable Bioplastics

- CSIR-IICT has transferred process technology Nanocellulose Engineered Starch based granules for compostable plastics as an alternative to single use synthetic plastic to Hyderabad based Greenworksbio Products.
- The compostable bioplastics are developed based on green chemistry principles certified by Chemical Engineering and Process Technology ((CIPET), ensuring no harmful chemicals are released during the composting process.
- High load bearing capacity, thinning down the size of bags, lower plastic consumption, reduction in agri-waste, better transparency, antimicrobial properties and improved printability are some of the features of the low cost bioplastics.

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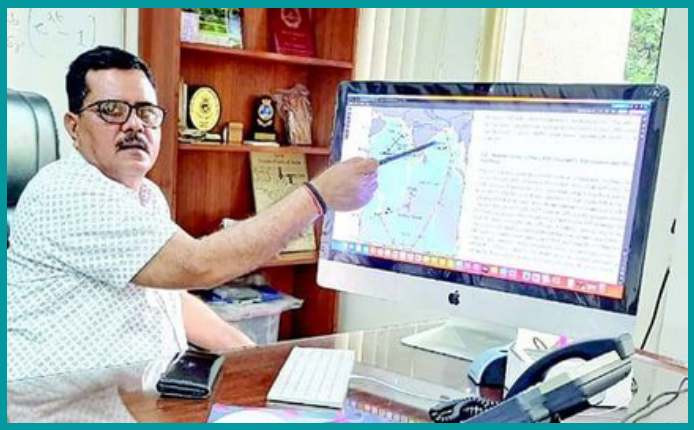

Image source: heraldgoa.in

NIO finds large cobalt reserves in Indian Ocean, boosts India's renewable energy hopes

- The CSIR National Institute of Oceanography (NIO) has discovered large deposits of dissolved cobalt in the northern Indian Ocean off the coast of India. Cobalt, a crucial micronutrient for ocean productivity, is also a key component in batteries used in electric vehicles, magnets for wind turbines, and green technologies.
- India's cobalt reserves remain modest, with small deposits in Odisha and Jharkhand, and no active mining leases for cobalt, nickel, lithium, or neodymium. This has been a significant barrier to the country's clean energy transition. Currently, India imports cobalt to meet its growing demand.
- The NIO's discovery if properly harnessed, can help in realising the country's ambitious target, which is to meet 50% of primary energy needs from renewable sources by 2030. The cobalt-rich deposits in the northern Indian Ocean could serve as a long-term resource, as shelf sediments and dust continuously replenish these metals.
- Director of NIO, Sunil Kumar Singh, emphasized the importance of developing technologies to extract and utilize this cobalt. Research is ongoing within NIO's laboratories, though it is still in the primitive stage. If successful, this could lead to the extraction of valuable metals like nickel and copper alongside cobalt.
- Furthermore, the study, published in Global Biogeochemical Cycles, suggests that cobalt's therapeutic potential could also aid in addressing vitamin B12 deficiencies. The findings were co-authored by Nirmalya Malla from CSIR NIO and the Academy of Scientific and Innovative Research (AcSIR).

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Image source: pib.gov.in

830 Students Nationwide Perform DNA Isolation at CSIR Labs under CSIR Jigyasa

- Around 830 school students from across the country participated in a DNA isolation activity organized by the Council of Scientific and Industrial Research (CSIR) at 33 of its laboratories.
- The event, coordinated by CSIR's Institute of Genomics and Integrative Biology (IGIB), was inaugurated by Dr. Souvik Maiti, Director, CSIR-IGIB, and Dr. Geetha Vani Rayasam, Head, CSIR-HRDG.
- Students from Class 9 isolated DNA from their saliva using DNA isolation kits under the guidance of senior scientists, including Dr. Beena Pillai and Dr. Arya Sidharthan.
- This activity helped students understand the structure of cells and the chemical nature of DNA. They also completed a questionnaire to assess their scientific aptitude, aiming to align career guidance and curriculum development with the New Education Policy 2020.
- The event was part of the CSIR-Jigyasa outreach program, which connects school students with scientists, engaging over 10 lakh students since its launch in 2017.

Image source: pib.gov.in

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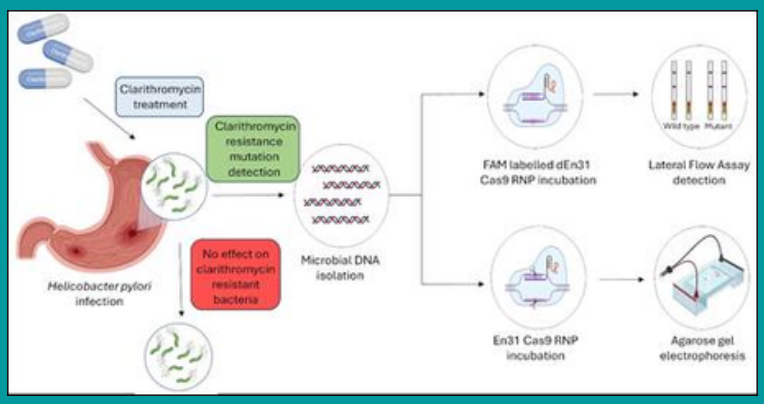

Image source: pib.gov.in

Cost-Effective CRISPR Test Detects H. pylori and Its Mutations in Remote Areas

- **Researchers at CSIR-IGIB and AIIMS have developed a CRISPR-based diagnostic method using engineered en31-FnCas9 to detect H. pylori and its antibiotic resistance mutations in dyspeptic patients. This method, integrated with a lateral flow assay (FELUDA), provides a rapid and cost-effective visual readout, ideal for resource-poor settings.**
- **H. pylori infections, linked to gastric disorders and antibiotic resistance, pose significant global health challenges. This study highlights the potential of sequencing-free molecular diagnostics to detect clarithromycin-resistant mutations in gastric biopsy samples. The approach offers tailored treatment insights, addressing antibiotic resistance and reducing risks of gastric cancer in underserved regions.**

CSIR's 2024 Milestones: Advances in Breast Cancer, Sickle Cell Anaemia, and Parkinson's Research

- **In 2024, the Council of Scientific and Industrial Research (CSIR) made significant strides in healthcare and innovation:**
- **Breast Cancer: CSIR-CCMB and RCC Thiruvananthapuram developed a low-cost, non-invasive blood test to detect early breast cancer by analyzing 439 miRNA signatures. They also initiated the Indian Breast Cancer Genomic Atlas (IBCGA) to map tumor genomes specific to Indian cases.**
- **Sickle Cell Anaemia: CSIR-CCMB created a rapid, accurate, and affordable test for identifying the genetic blood disorder, especially in tribal and mainland populations.**
- **Parkinson's Disease: CSIR-IMTech discovered promising molecules, filing international patents, with potential for a cure for Parkinson's.**

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Image source: Biomall.in

CSIR-CSIO Indigenously developed "Paracetamol" a widely used pain reliever and fever reducer

At the 40th Foundation Day celebration of the Department of Scientific and Industrial Research (DSIR) held at Dr. Ambedkar International Centre, Union Minister Dr. Jitendra Singh, who holds multiple positions including Minister of State (Independent Charge) for Science and Technology, Earth Sciences, Atomic Energy, Space, and PMO, announced the development of an indigenously developed "Paracetamol." This widely used medication for pain relief and fever reduction has been developed by the Council of Scientific and Industrial Research (CSIR), which is affiliated to the Ministry of Science and Technology, Government of India.

Dr. Singh highlighted that CSIR has successfully developed indigenous technology for the production of paracetamol. This innovation is aimed at enhancing India's self-sufficiency in the manufacturing of paracetamol, thereby reducing the country's dependence on imported raw materials. Currently, India imports the key ingredients for paracetamol from various nations.

To implement this, Karnataka-based Satya Deeptha Pharmaceuticals Ltd., will take on the task of producing affordable paracetamol domestically. This move is expected to significantly reduce reliance on foreign imports and supports the broader vision of "Atmanirbhar Bharat" (Self-Reliant India), as championed by Prime Minister Narendra Modi.

CDRI research a ray of hope for triple negative breast cancer patients

A recent breakthrough study led by Prof. Dipak Datta, Senior Scientist at CSIR Central Drug Research Institute, highlights the potential of targeting the enzyme acyl-CoA synthetase 4 (ACSL 4) to treat triple negative breast cancer (TNBC). This study, published in the Proceedings of the National Academy of Sciences, provides new insights into the role of ACSL 4 in promoting cancer cell migration and metastasis. Research team conducted a series of experiments on TNBC cell lines, mouse models, and human tissue samples. Their findings show that ACSL 4 plays a crucial role in the spread of TNBC by facilitating fatty acid metabolism, which provides the high energy demand of cancer cells during metastasis. By inhibiting ACSL 4, researchers believe it may be possible to disrupt these metabolic and epigenetic changes, potentially halting the spread of cancer cells to distant organs. With India being the global hotspot for TNBC cases, this discovery could pave the way for novel therapeutic strategies to combat the disease

Image source: timesofindia.indiatimes.com

Edition: 6th - 10th January 2025

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Image source: e-pao.net

CSIR NEIST, partnered with Kurao Herbal Pvt Ltd launches herbal tea

- **Kurao Herbal Tea manufactured by Kurao Herbals Pvt Ltd in collaboration with CSIR North East Institute of Science and Technology (CSIR NEIST), was launched at CSIR NEIST office, Lamphelpat on Friday.**
- **The launch programme was attended by former union minister of state for education and external affairs Dr RK Ranjan as chief guest and CSIR NEIST Branch Lab chief scientist Dr Huidrom Birkumar Singh as president, while College of Food and Technology CAU, Iroishemba dean professor Ng Iboyaima Singh, MSME Technology Centre Nilakuthi Food Park, Imphal deputy director Dr S Yoirentomba Meitei and Meira Paibi activist Moirangthem Ibemhal Devi were present as guests of honour**
- **Dr H Birkumar said that Kurao Herbal Pvt Ltd, Moirangkhom has been partnering with CSIR NEIST for a long time now. He informed that the Kurao Herbal Tea has been made from a blend of locally grown black ginger, known as (Yaingang Amuba or Yaimu) and a protein rich sacha inchi (sacha peanut) plant.**

Two rare Neuroptera species found for the first time from Kerala

- **Researchers from the Shadpada Entomology Research Lab at Christ College, Irinjalakuda, have found two rare Order Neuroptera species, Glenochrysa zeylanica and Indophanes barbara from Kerala.**
- **The species, Glenochrysa zeylanica and Indophanes barbara, were previously reported only from Sri Lanka. Glenochrysa zeylanica, a green lacewing from the Chrysopidae family, was rediscovered after 111 years in Wayanad, marking its first report in India.**
- **Indophanes barbara, an antlion from the Myrmeleontidae family, was found in several locations across Kerala, including Irinjalakuda, Thrissur, Palakkad, Kozhikode, Kannur, Malappuram, and Thiruvananthapuram**
- **These discoveries highlight the faunal similarities between Kerala and Sri Lanka.**
- **This marks the 12th green lacewing and 8th antlion species reported from Kerala, with the research supported by the Council of Scientific and Industrial Research (CSIR), New Delhi.**

Image source: telanganatoday.com

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Image source:timesofindia.indiatimes.com

CSIR CIMAP Supports Expansion of Japanese Mint Cultivation in Koraput to Boost Farmers' Income

- **The Koraput administration has expanded the cultivation of Japanese mint across 40 acres in the Pottangi, Narayanpatna, and Bandhugaon blocks, involving over 75 tribal farmers. The expansion, supported by the CSIR Central Institute of Medicinal and Aromatic Plants (CIMAP), is funded with Rs 45 lakh from the District Mineral Fund over three years in collaboration with the Odisha Rural Development and Marketing Society (ORMAS).**
- **Two varieties of Japanese mint, Kosi and Kranti, were introduced, and the encouraging response was received. Unlike other varieties, Japanese mint is harvested between paddy and maize cultivation seasons. It is used in food flavoring, medicine, confectionery, soft drinks, and pharmaceuticals. Recent tests on mint from Kondapadi village are exploring its suitability for applications like chewing gum**
- **The crop is yielding promising results, with one acre producing three tonnes of fresh biomass and 40 to 55 liters of oil, which is sold at Rs 1300 to Rs 1500 per liter. The project also includes a mint oil extraction unit at Sipaiput, and each acre is expected to generate a net income of around Rs 35,000. Deputy Director of ORMAS, Roshan Kartik, expressed confidence that mint cultivation will improve the livelihoods of tribal farmers and establish Koraput as a significant player in the aromatic plant market.**

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CSIR- CBRI Technologies to Contribute to Infrastructure like Shelters, Roads, Drinking Water Systems in the Model Village

Image source: pib.gov.in

- **The foundation stone for a Model Resilient Village was laid at Sil Sunani in Bawasni Gram Panchayat, Solan District, Himachal Pradesh on January 20, 2025. This initiative, launched in response to the devastating cloudburst-induced landslide of August 14, 2023, is a collaborative effort between CSIR, the Government of Himachal Pradesh, Bal Raksha Bharat, and Zee Entertainment.**
- **The project aims to redevelop the village with essential infrastructure, including housing, schools, healthcare facilities, and community support systems, to strengthen its resilience against future disasters. Dr. N. Kalaiselvi, Secretary of DSIR and Director General of CSIR, highlighted CSIR's role in providing technical expertise, while Prof. R. Pradeep Kumar, Director of CSIR-CBRI, detailed the technical contributions to the project's design.**
- **An exhibition showcasing resilient construction technologies was a key highlight. Local residents and officials pledged continued support, marking the initiative as a significant step toward sustainable rural development and disaster preparedness. This project reflects India's commitment to transforming disaster-hit areas into resilient communities.**

CSIR SERC transfers tech to industry partners

- **CSIR Structural Engineering Research Centre (SERC) has transferred three cutting-edge technologies to industry partners: the "Emergency Retrieval System" (ERS), "High Velocity Multi Hit Resistant Movable Protective Booth" for security personnel, and "Portable Lightweight Foldable Module for Make Shift Hospitals (PoliTal M)." The event, held at the Innovation Complex in Mumbai, was attended by key dignitaries including Dr. N Kalaiselvi, DG, CSIR, and Dr. Jitendra Singh, Union Minister of State for Science and Technology.**
- **The agreements were signed by Dr. N Anandavalli, Director, CSIR SERC, with M/s Hi Tech Systems and M/s Hemagni Build Pro Industries. The ERS technology, developed for rapid power restoration during tower failures, is scalable for transmission lines up to 800 KV and aligns with the 'Make in India' initiative. This breakthrough has led to two patent filings, both nationally and internationally.**

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With successful trials, CDRI a step closer to antimalarial vaccine

Image source: timesofindia.indiatimes.com

- In a significant advancement toward an antimalarial vaccine, scientists from the CSIR Central Drug Research Institute (CDRI) have developed a novel whole parasite vaccine. This vaccine, which contains every molecule of the malaria-causing parasite strain, has shown 100% efficacy in preclinical animal trials. The research, led by scientists Akancha Mishra, Plabita Paul, and Satish Mishra, was published in NPJ Vaccines.
- The vaccine works by deleting two specific genes, SCD and SCOT1, which weakens the parasite and allows it to multiply in the liver. This process helps the body build immunity against malaria without progressing to the bloodstream, where the infection typically causes symptoms. By arresting the parasite in the liver, the vaccine prevents the full malaria infection cycle.
- The next step is to develop the vaccine for human use, focusing on the human malaria parasite Plasmodium falciparum. The World Health Organization has emphasized the need for malaria vaccines that prevent more than 90% of infections. This promising development, which could save millions of lives, is a crucial step forward in the fight against malaria

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Image source: thehindu.com

CSIR IICT signs pact with pvt. firm to convert farm waste into compostable sanitary pads

- **CSIR Indian Institute of Chemical Technology (CSIR IICT), Hyderabad, has unveiled a groundbreaking "Wealth out of Waste" technology, an innovative initiative jointly developed with its industrial partner, Aakar Innovations Pvt Ltd to convert agricultural waste into valuable resources like compostable sanitary pads. The collaboration focuses on the commercial production of pulp from agricultural waste, particularly banana pseudostem.**
- **The patented process, demonstrated on a 50-litre pilot scale, extracts pulp with superior adsorption and retention properties, offering a sustainable and cost-effective alternative to traditional pinewood pulp.**
- **The technology enables production of affordable, compostable sanitary pads, addressing critical social issues such as menstrual health, especially in rural and underprivileged communities.**
- **The technology transfer ToT agreement was formalised last week in Mumbai in the presence of Union Minister of State for Science Technology Jitendra Singh, CSIR DG N Kalaiselvi and NITI Aayog member V K Saraswat. Dr. Kalaiselvi praised the initiative as a prime example of successful public-private partnerships driving sustainable societal impact.**

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Image source: hindustantimes.com

Farmers share success stories of CIMAP innovation at Kisan Mela

- The two-day Kisan Mela at CSIR-CIMAP in Mohanlalganj, Lucknow, showcased the transformative power of scientific farming practices through inspiring success stories from local farmers. Ram Singh from Ghursara village shared how he shifted from traditional crops like opium to menthol mint farming in 1992, adopting menthol oil extraction, vermicomposting, and beekeeping to boost his income and support his children's education.
- Similarly, Pramod Kumar from Barabanki increased his menthol oil production by using CSIR-CIMAP's improved mint variety and diversified into organic potatoes, vermicomposting, and beekeeping, significantly improving his livelihood.
- The event featured key speakers like Vijay Bahadur Dwivedi and GN Singh, along with tech demonstrations highlighting the role of drones and distillery units in modern farming. The Kisan Mela emphasized that with the right scientific knowledge and tools, farmers can enhance their incomes, uplift their families, and contribute to community growth.

CSIR CIMAP to launch new tulsi , geranium varieties at Kisan Mela

- CSIR CIMAP, Lucknow, will launch new high-yielding varieties of tulsi and rose-scented geranium at the Kisan Mela 2025. The Sim Saraswati tulsi variety, rich in linalool, is cold-tolerant and yields up to 180 liters of essential oil per hectare with two harvests per year. Additionally, CIM Sangam, a high-yielding rose-scented geranium, offers 60-65 kg of essential oil per hectare in a single harvest, making it ideal for the perfumery industry due to its optimal citronellol to geraniol ratio.
- The event will attract over 5,000 farmers and entrepreneurs from across India and focus on advanced cultivation methods, marketing strategies, and the sale of improved planting materials. There will also be live demonstrations on distillation units and training sessions on utilizing floral and aromatic crop waste to create incense, rose water, and other products.

Image source: timesofindia.indiatimes.com

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सीएसआईआर-सीरी की बडी छलांग LED चिप का किया निर्माण -SEMICONDUCTOR CHIP

- केंद्र सरकार के "विकसित भारत 2047" विजन के तहत, सीएसआईआर-सीरी के वैज्ञानिकों ने सेमीकंडक्टर चिप्स के निर्माण में महत्वपूर्ण सफलता हासिल की है, जिससे भारत की विदेशी देशों पर निर्भरता कम हो गई है। एलईडी चिप्स लाल, नीले, हरे और सफेद रंग की रोशनी देने में सक्षम हैं। पहले भारत को इन चिप्स के लिए ताइवान, जापान और साउथ कोरिया जैसे देशों पर निर्भर रहना पड़ता था, लेकिन अब ये चिप्स भारत में ही निर्मित होंगे।

Image source: etvbharat.com

- सीएसआईआर-सीरी के निदेशक डॉ. पीसी प्रधान ने बताया कि इस प्रोजेक्ट को सफल बनाने के लिए वैज्ञानिकों ने कई तकनीकी चुनौतियों का सामना किया, जैसे कि सामग्री का चयन, फैब्रिकेशन प्रक्रिया, पैकेजिंग, एकीकरण और गुणवत्ता नियंत्रण।
- सीनियर वैज्ञानिक डॉ. कुलदीप सिंह ने बताया कि इस क्षेत्र में आगे बढ़ने के लिए बड़े निवेश की जरूरत है, जिससे की आने वाले समय में भारत सेमीकंडक्टर चिप्स के उत्पादन में आत्मनिर्भर बन सकता है।

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Lucknow's Heritage Revitalized with 'Andaaz-e-Awadh' & CSIR-NBRI

- **As part of the 'Andaaz-e-Awadh' heritage beautification project, CSIR-NBRI is leading the plantation work at a fragrance park opposite the historic Hussainabad Clock Tower. This initiative blends botanical expertise with urban beautification to promote Lucknow as a cultural and tourist destination, reflecting CSIR's role in green urban development.**
- **The initiative integrates botanical science and urban heritage, enhancing the aesthetic appeal and promoting eco-conscious tourism in Lucknow's historic quarters.**
- **Alongside heritage restoration, CSIR-NBRI's contribution ensures that sustainability and biodiversity are central to the city's cultural redevelopment efforts.**

CSIR-NCL & Indian Air Force Rejuvenate MiG-29 Oxygen Systems

- **CSIR-NCL, Pune, in collaboration with the Indian Air Force, resolved a critical issue in the Oxygen Generation System (OBOGS) of MiG-29 jets. By rejuvenating zeolite materials and setting up an on-site oxygen rejuvenation facility at 11 BRD, CSIR-NCL has significantly improved pilot safety and operational performance, reinforcing India's defence self-reliance under Atmanirbhar Bharat.**
- **The initiative led to the successful deployment of rejuvenated OBOGS units in operational jets, enhancing pilot safety and aligning with Atmanirbhar Bharat goals.**
- **A dedicated oxygen rejuvenation facility was established at the Indian Air Force's 11 Base Repair Depot, enabling in-house servicing and long-term self-sufficiency in critical defence technology.**

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India Strengthens Blue Economy Services with INCOIS Launch

- **To mark its 26th Foundation Day, INCOIS launched two landmark services: the Hilsa Fishery Advisory (HiFA) for better fishery forecasting and the INCOIS Global Ocean Reanalysis (IGORA) to enhance oceanographic understanding. A significant MoU was signed between CSIR-CCMB and INCOIS, along with other partners like ICAR-CIFE and CDRI, to collaborate on climate resilience, marine biodiversity, and disaster preparedness.**
- **The INCOIS Global Ocean Reanalysis (IGORA) service uses historical satellite and ocean observation data to track changes in temperature, currents, and salinity, helping India lead in climate modeling and ocean research.**
- **These services complement India's broader Blue Economy roadmap, enabling early warning systems, marine biodiversity conservation, and coastal infrastructure planning based on real-time scientific inputs.**

Scientists Uncover 29,000-Year Ocean-Climate Link in Indian Ocean

- **Researchers from CSIR-National Institute of Oceanography (NIO) and Banaras Hindu University (BHU) analyzed 29,000 years of geological and oceanographic data to reveal how Indian Ocean currents have historically influenced climate cycles.**
- **The study found strong links between changes in oceanic flow and major climate events, including shifts in the Indian monsoon. These insights are crucial for predicting future climate patterns in the face of global warming.**
- **This research enhances our understanding of paleoclimate and ocean dynamics, helping scientists and policymakers model future climate resilience strategies, especially for coastal and agricultural planning.**

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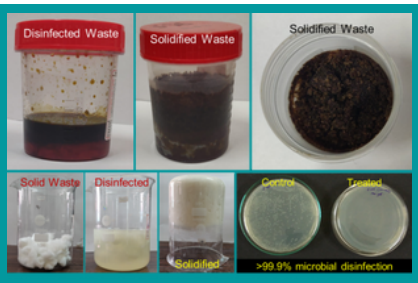
Women in Leather: CSIR's Skill Training in J&K

- **CSIR-IIIM, CSIR-CLRI, and CEL launched a skill development program for women in J&K focused on leather goods manufacturing. This CSR-supported initiative aims to enhance entrepreneurship and economic independence among women by training them in design, production, and marketing of leather products.**
- **Participants learned to design and create leather accessories, gaining skills in cutting, stitching, finishing, and marketing—opening up new employment and self-employment avenues in the region.**
- **Supported under Corporate Social Responsibility (CSR) initiatives, the program is helping women gain economic independence while reviving local craft traditions with modern market relevance.**

India's First Indigenous Biomedical Waste Treatment Plant Launched

- **CSIR-NIIST unveiled "Sṛjanam", India's first automated biomedical waste treatment plant, at AIIMS, New Delhi. This eco-friendly rig disinfects toxic medical waste like blood, urine, and lab disposables—without incineration, making it safer and energy-efficient. With a capacity of 400 kg/day, the system reduces health hazards and supports the 'Waste to Wealth' mission.**
- **The plant can treat 400 kg of waste daily, emitting a pleasant fragrance and minimizing health risks for sanitation workers. The technology has been third-party validated for antimicrobial efficacy.**
- **Aligned with India's environmental and health priorities, the innovation supports the government's vision for sustainable healthcare infrastructure and circular economy models.**



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CSIR-CMERI Drain Cleaning Technology Aims to End Manual Scavenging

- **CSIR-CMERI introduced a low-cost mechanical drain-cleaning machine to civic authorities in Chennai, offering a humane and efficient alternative to manual sewer cleaning. The technology helps clear debris, plastic, and roots in sewer lines, significantly improving urban sanitation and worker safety.**
- **This innovation provides a cost-effective alternative to expensive jet rodding machines and reduces the risk to sanitation workers, helping prevent fatalities associated with manual scavenging.**
- **The system was presented to civic agencies in Chennai for deployment, reinforcing India's push for technology-driven, dignified sanitation solutions in urban infrastructure.**

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Two Green Pesticides Transferred for Sustainable Farming

- **Two novel, 100% bio-based agricultural pest-control products, AphidControl and XanthoControl, were transferred for commercialization under the PSA's Deep Science Innovation Program. These offer eco-friendly alternatives to synthetic pesticides and are crucial for reducing crop losses (10–35%).**
- **These plant-derived formulations effectively target aphids and Xanthomonas bacteria, helping prevent 10–35% crop losses while preserving soil health and biodiversity.**
- **The launch aligns with India's goals for sustainable agriculture and environmental conservation, offering accessible, scalable solutions to farmers facing pest-related challenges.**
- **The collaboration of CSIR-IHBT, CSIR-CIMAP, IBSD, DBT, and PI Industries Ltd made this possible.**

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CSIR Floriculture Mission Benefits 3,800 Farmers

- **CSIR-IHBT expanded floriculture across 1,000 hectares, impacting 3,800 farmers across northern India and generating ₹80 crore in revenue. The Aroma and Millet Missions also promoted health and sustainable agriculture, while new facilities like the Heeng Seed Centre boost local spice production.**
- **Farmers adopted CSIR-developed flower varieties and value-addition techniques, resulting in enhanced yields and better market returns—generating over ₹80 crore in revenue.**
- **The mission is not only creating green jobs but also transforming marginal and hilly lands into productive flower farms, advancing CSIR's goal of science for rural prosperity.**

CSIR-IMTECH Accelerates India's Antibiotic Innovation

- **CSIR-IMTECH showcased its contributions to combating antibiotic resistance through breakthroughs in microbial genetics and the launch of India's first indigenous antibiotic, Nafithromycin. The institute supports pharmaceutical and environmental sustainability using its 14,000-strain Microbial Culture Collection.**
- **The institute's 14,000-strain Microbial Culture Collection is driving innovation in drug discovery, industrial enzymes, and probiotics, supporting both healthcare and biotechnology sectors.**
- **With India grappling with antimicrobial resistance (AMR), IMTECH's work is vital in enabling self-reliant pharmaceutical innovation, contributing to national health security and global AMR solutions.**

Image source: imtech.res.in

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Dehradun Hits 300 Plastic Banks – A Growing Movement and a Rising Concern

- Dehradun celebrated the milestone of 300+ Plastic Banks, a waste collection initiative started by SDC Foundation with support from CSIR-IIP and other partners. What began with just one school and 55 girls now reaches over 1 lakh citizens, including 40,000 students, across schools, hostels, colleges, and marketplaces.
- At a public event held at IRDT Auditorium, experts—including Dr. Harender Bisht, Director of CSIR-IIP—praised the initiative but emphasized the urgent need for better waste management infrastructure and rural outreach. Folk artist Narendra Singh Negi and environmentalists warned that unregulated plastic waste could have catastrophic environmental consequences.
- A panel discussion featuring CSIR-IIP, educational institutions, and private sector stakeholders explored how plastic can be a resource, not waste. Students from Sophia High School also delivered a play dramatizing the plastic crisis. Awards were presented to leading schools for creative awareness efforts.

Study Links Marrying Within Communities to Higher Disease Risk

- A new study by CSIR-CCMB, published in the Journal of Genetics and Genomics, found that marrying within small or closed communities (endogamy) increases the risk of population-specific genetic diseases, such as ankylosing spondylitis, observed notably in the Reddy community of Andhra Pradesh.
- Researchers examined 281 high-coverage exome sequences and discovered that the HLA-B27:04 gene variant significantly heightens disease susceptibility. The team also found numerous population-specific genetic mutations influencing drug response and metabolism, underlining the importance of personalized medicine.
- The study highlights the urgent need for genetic screening, community-specific health awareness, and counselling programs in endogamous populations across India to reduce hereditary disease risks and improve healthcare outcomes.

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Extract from 'CSIR Matters' (Edition 01-05 March 2025)

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Amrut Biodiversity Park Inaugurated in Delhi to Boost Green Cover

- **Delhi Lieutenant Governor Vinai Kumar Saxena inaugurated the Amrut Biodiversity Park, developed jointly by CSIR-NBRI and Delhi Development Authority (DDA) as part of the Yamuna Floodplain Restoration initiative. Spread across 115 hectares, the park lies along NH-24 near the Commonwealth Games Village.**
- **Unique in its concept, the park features tracks themed on India's freedom movement, named 'First War of Independence', 'Santhal Rebellion', 'Champaran Satyagraha', 'Dandi March', and 'Azad Hind Fauj', blending ecology with history to engage and educate the public.**
- **With 14,500 native trees, 3.2 lakh riverine grasses, and four restored water bodies, the park exemplifies ecological rejuvenation. Despite concerns about flooding raised by environmental groups, officials remain confident the park will become a thriving green space and bird habitat.**

e-Tractor Roadshow Flagged Off by Dr. Jitendra Singh to Promote Sustainable Farming

- **Union Minister Dr. Jitendra Singh flagged off the CSIR-developed e-Tractor roadshow from Jammu to Kanyakumari, promoting eco-friendly agricultural mechanization. The roadshow will showcase cost-effective, zero-emission technology to farmers across India.**
- **Developed by CSIR-CMERI, the e-Tractor and e-Tiller aim to reduce farmers' operational costs, minimize carbon emissions, and make farming accessible for women. The roadshow also includes live demonstrations and interaction with farming communities.**
- **Speaking at the event, Dr. Singh emphasized the need to integrate clean energy with agriculture, highlighting the government's Bio-E3 policy (Biotechnology for Environment, Economy, and Employment) and support for agri-startups and women entrepreneurs.**

Image source: cmeri.res.in

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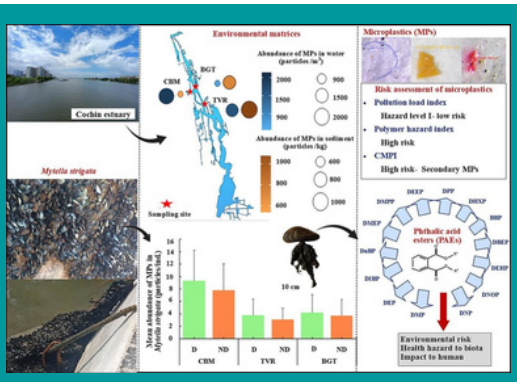

Image Source: sciencedirect.com

Microplastic Pollution Alarms Scientists in Cochin Estuary Mussels

- **A joint study by CSIR-NIO, Kochi, and Cochin University of Science and Technology revealed 100% microplastic contamination in the invasive mussel species Mytella strigata found in the Cochin estuary. This mussel has replaced native species and is actively consumed, posing ecological and health concerns.**
- **The study found 14 types of plastic additives and 38 polymers such as PVC, PA6, PVAL, and PC in mussels, water, and sediments. Microplastic particles in mussels ranged from 3.1 to 9.3 per individual, highlighting serious bioaccumulation risks.**
- **Published in Science of The Total Environment, this is the first study of its kind in the region. It calls for immediate pollution control, ecosystem monitoring, and policy interventions to address the growing marine plastic crisis.**

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Holy Colors from Nature – Herbal Gulal from Kachnar Blossoms

- **On the occasion of Holi, CSIR-NBRI delivered 70 packets of herbal gulal made from Kachnar flowers to Ram Mandir, Ayodhya and Kashi Vishwanath Dham, celebrating with skin-safe, eco-friendly colors rooted in India's cultural and botanical heritage.**
- **Kachnar, considered the state tree during Ram Rajya, is rich in Ayurvedic medicinal properties—anti-inflammatory, anti-bacterial, anti-diabetic. The herbal gulal is free from toxic chemicals like lead, chromium, and nickel, ensuring it is safe for both skin and environment.**
- **CSIR-NBRI has licensed technology for Kachnar-based colors under the 'Shri Ganesha' brand, extending previous innovations using rose, hibiscus, jasmine, and marigold. The gulal is non-staining, easy to wipe, and a vibrant, responsible alternative to synthetic colors.**

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CSIR-NBRI Trains Andaman Women in Scientific Beekeeping

- **For the first time, CSIR-National Botanical Research Institute (NBRI), Lucknow conducted a scientific beekeeping training program at Krishi Vigyan Kendra, Sippighat, Andaman Islands, focusing on women farmers and Self-Help Groups.**
- **Conducted under the CSIR Floriculture Mission, the training emphasized the integration of apiculture with floriculture, highlighting how pollination can enhance crop yields, biodiversity, and farmer income diversification.**
- **With support from ICAR-CIARI and the Port Blair Agriculture Department, the program introduced knowledge-based techniques to improve honey yield, bee health, and environmental awareness—offering an important income avenue for remote island communities.**

India's First National Sensor Hub to Rise in Kolkata

- **The CSIR–Central Glass & Ceramic Research Institute (CGCRI) in Kolkata is set to host India's first National Sensor Hub, focusing on the development of fiber-based sensors for critical sectors such as defence, railways, infrastructure, and smart cities.**
- **These advanced sensors are designed to monitor structural health, vibrations, and environmental parameters in real-time, enhancing safety and efficiency in applications ranging from military equipment to urban infrastructure.**
- **The hub will serve as a platform for interdisciplinary research, bringing together experts from materials science, electronics, and data analytics to drive innovation and commercialization of sensor technologies.**

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India's First Stevia Processing Plant Inaugurated in Himachal Pradesh

- **On March 17, 2025, Dr. N. Kalaiselvi, Director General of CSIR and Secretary, DSIR, inaugurated the RJ Saints Stevia Processing Plant in Singha village, Una district, Himachal Pradesh. Developed with technical support from CSIR-Institute of Himalayan Bioresource Technology (IHBT), Palampur, this is India's first-of-its-kind green processing unit capable of converting dried stevia leaves into steviol glycoside powder, a natural, low-calorie sweetener .**
- **The plant sources its raw material from over 200 acres of stevia cultivation, where the 'Him Stevia' variety, developed by CSIR-IHBT, is grown. This variety boasts a 14.5% glycoside content, making it highly efficient for sweetener extraction. Advanced farming techniques, including drone-assisted nutrient spraying, are employed to enhance yield and quality .**
- **Stevia is approximately 300 times sweeter than sucrose and is suitable for diabetics, offering a healthier alternative to traditional sugar. With India facing a growing diabetes epidemic, this initiative aims to provide a sustainable solution for both health-conscious consumers and farmers seeking alternative income sources .**

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India Maps 10,000 TB Genomes – A Landmark in Disease Surveillance

- **On World Tuberculosis Day (March 24, 2025), Union Minister Dr. Jitendra Singh announced the completion of genome sequencing of 10,000 isolates of Mycobacterium tuberculosis. This milestone is part of the Dare2eraD TB program, aiming to eliminate TB in India five years ahead of the global deadline.**
- **The initiative is led by the Indian Tuberculosis Genomic Surveillance (InTGS) Consortium, a collaboration of CSIR, DBT, and ICMR, working alongside premier clinical and research institutions. The program is set to scale up to 32,000 genomic sequences, helping detect drug resistance mutations and improve diagnostics.**
- **This genomic database is expected to revolutionize TB diagnosis and treatment, enabling personalized care and informed policy decisions. Dr. Singh emphasized a "whole-of-science, whole-of-government" approach to achieving a TB-free India by 2025.**

₹42-Cr Agri-Tech Project to Revolutionize Himalayan Farming

- **The Government of India has sanctioned a ₹42-crore Agri-Excellence project titled "Application of Electronics and ICT in Himalayan Region Crop Management", led by Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K). This four-year initiative, under the Ministry of Electronics and Information Technology (MeitY), aims to integrate AI, IoT, robotics, and precision farming into the cultivation of saffron, walnuts, and apples—key crops in Jammu & Kashmir's bioeconomy.**
- **The project brings together leading institutions, including C-DAC (Kolkata & Mohali), CSIR-CMERI (Durgapur & Ludhiana), and CMTI (Bengaluru). Innovations will include robotic weeders and stigma separators for saffron, AI-based walnut grading and aflatoxin detection, and non-invasive apple quality assessment tools.**
- **SKUAST-K will host hackathons and grand challenges to foster student-led agri-tech solutions. The university's Centre for Artificial Intelligence and Machine Learning (CAIML), developed in collaboration with IIT Mandi, will serve as a hub for research and training, furthering its mission to modernize Himalayan agriculture**

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Chandigarh to Build ₹475 Cr Integrated Waste-to-Biogas Plant

- **Chandigarh is set to construct its first Integrated Municipal Solid Waste Processing Plant with a capacity of 550 tons per day (TPD). This facility will convert organic waste into Compressed Biogas (CBG), marking a significant step towards sustainable waste management. The project is planned for a 17-year period, including 2 years for construction and 15 years for operation and maintenance.**
- **The plant's construction cost is estimated at ₹475 crore, with an annual operation and maintenance cost of approximately ₹66 crore. Additionally, a Viability Gap Funding (VGF) of ₹80 crore will be provided one year after the commercial operation date. The project has received environmental clearance from the Union Ministry of Environment, Forest and Climate Change and is being developed in collaboration with CSIR-NEERI and IIT Ropar.**
- **Currently, Chandigarh generates around 500 TPD of waste, with projections indicating an increase to 740 TPD by 2051. The new plant aims to efficiently manage this growing waste load while producing clean energy, thereby reducing landfill dependency and promoting environmental sustainability**