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Innovations and Contributions by CSIR labs

In this issue:

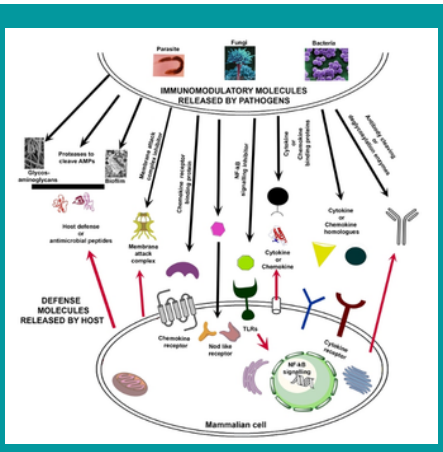

Image source: cdri.res.in

CSIR-CDRI's New Weapon to Fight AMR

- Antimicrobial resistance (AMR) is fast becoming a global killer, with 35 million deaths annually linked to resistant infections.
- AMR is said to occur when frontline antibiotics become powerless in treating bacterial infections.
- Consequently, AMR poses significant challenges to healthcare worldwide.
- Now, CSIR – Central Drug Research Institute (CDRI) of Lucknow has come up with a novel antimicrobial agent, infuzide, which could infuse fresh momentum into the battle against AMR.

CSIR-NAL's Non-destructive Technique to Detect Aircraft Damage

- CSIR - National Aerospace Laboratories (NAL) of Bangalore has developed a technique using ultrasonic guided waves to detect damage in aircraft.
- They claim the technique is faster and more cost-effective than conventional ones.
- This reliable way of damage detection not only improves aircraft safety and maintenance, but will also be useful for the armed forces.
- While pristine structures show smooth wave patterns, damaged components induce noticeable disruptions in waves.

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Image Source: Wikipedia
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UP Mint Farmers Harnessing the Power of Solar Energy

- **Around 35 km away from Lucknow, in a small village in Barabanki, a farmer uses solar power to extract essential oil from his mint plants.**
- **This has been made possible due to the efforts of CSIR - Central Institute of Medicinal and Aromatic Plants (CIMAP) of Lucknow.**
- **CIMAP has developed an eco-friendly Centralised Solar Hybrid Distillation Unit (CSHDU) for essential oil extraction from mint.**
- **This technique will go a long way in reducing carbon emissions and increasing farmers' income.**

Single-use Plastics Choking Goa's Mangroves

- **Single-use plastics like wrappers, bags and bottles are choking Goa's mangroves, says a study from CSIR - National Institue of Oceanography of Goa.**
- **Most of this litter comes from urban run-off and tourism-related activities.**
- **Bottles, bags and packaging accumulate in mangrove forests, and obstruct the natural water flow and nutrient cycling.**

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CSIR-NCL Finds COVID Traces in Pune Sewage

- **Wastewater surveillance by CSIR – National Chemical Laboratory (NCL) has found COVID-19 viral presence in all 10 sewage treatment plants in Pune since early May.**
- **This reveals a pattern similar to that observed before the previous COVID surges.**
- **These patterns could give insight into COVID transmission trends.**
- **While clinical testing depends on individual behavior, wastewater surveillance can provide community-level statistics.**
- **Wastewater surveillance has emerged as a crucial early warning system for monitoring community spread of COVID-19.**

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Delhi Zoo Joins Hands with CSIR-CCMB to Chart Out its New Conservation Plan

- With an aim to save endangered species, the National Zoological Park of Delhi is contemplating setting up an onsite wildlife biobank in collaboration with Hyderabad-based CSIR - Centre for Cellular and Molecular Biology (CCMB).
- The facility will preserve DNA samples, tissues and reproductive cells from animals at the zoo.
- A similar model has already been implemented at the Padmaja Naidu Himalayan Zoological Park in Darjeeling, which became the first to establish such a facility earlier this year.

Climate Change Endangering India's Embayed Beaches

- A study by CSIR – National Institute of Oceanography (NIO), Goa, has found that climate change and human activity are leading to the washing away of sand on embayed beaches along India's west coast, and causing their shrinkage.
- Beaches nestled between rocky headlands or capes are called embayed beaches.
- The researchers studied how the shape of the beaches and the coastline changed in the west coast over the past three decades.

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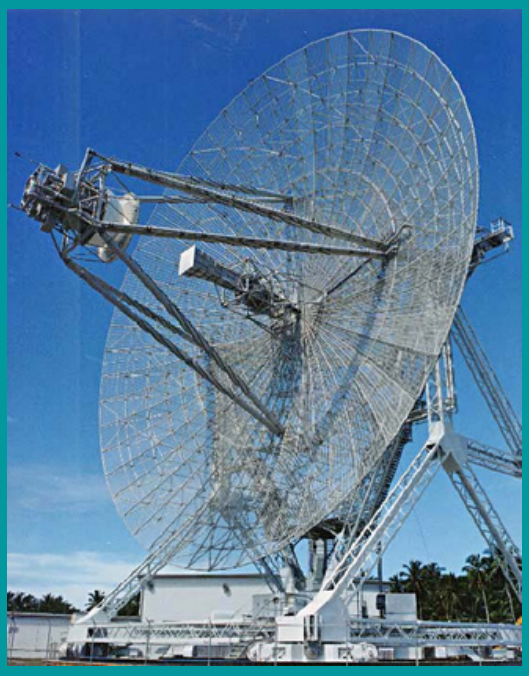

Image source: Wikipedia
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CSIR-CEERI Uncovers a Way to Enhance Radar and Communication Systems Performance

- **A study by Pilani-based CSIR – Central Electronics Engineering Research Institute (CEERI) has found that the efficiency of microwave-based equipment can be significantly increased by altering the shape of one of the components.**
- **The anode vane is a component arranged radially inside the anode, and its precise shape and dimensions are important factors affecting the energy efficiency of radars and other communication equipment.**
- **In the study, they chamfered the axial edges of the anode vanes, that is, cut them at an angle to create a symmetrical slope.**
- **They then compared the chamfered and unchamfered vanes for power and efficiency.**
- **They found that the power output increased by 44% while the efficiency increased to 80%.**

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Image Source: niist.res.in

CSIR-NIIST Creates Millet Nutribars

- **New sorghum (jowar) nutribars developed by CSIR – National Institute for Interdisciplinary Science and Technology (NIIST) in Thiruvananthapuram have hit the shelf, which are free of synthetic additives, preservatives and refined sugars.**
- **The nutrition bar instead contains natural sweeteners, nuts and seeds.**
- **The high-protein sorghum bar will be mass produced by Sabari Agro Food Products, a Thiruvalla-based private firm.**

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Ground Motion Simulation can Minimize Earthquake Risk

- **Devising ways to predict earthquakes is one of the biggest challenges for scientists.**
- **The Himalayan Belt, including Kashmir, Nepal and Uttarakhand, is particularly vulnerable, and suffers damage due to earthquakes often.**
- **There are three important factors in predicting earthquakes- its location, time and intensity.**
- **While it is comparatively easier to identify where an earthquake will occur, its intensity and timing cannot be predicted.**
- **Now, latest research from CSIR – Fourth Paradigm Institute (4PI) in Bangalore suggests that damage from earthquakes can be minimized by estimation of the intensity of an earthquake using ground motion simulation.**

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CSIR-IICT Devises Way to Reuse Crop Residue as Nutritious Cattle Fodder

- **Scientists at CSIR – Indian Institute of Chemical Technology (IICT) in Hyderabad have found a way to convert paddy straw and rice and wheat husk into not just nutritious fodder for cattle, but also compressed biogas and fermented organic manure.**
- **Farmers generally burn crop residue, causing environmental pollution.**
- **Scientists at IICT have found a simple chemical treatment for crop residue that can not only enhance its nutrient value, but also reduce pollution caused due to burning.**

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Image Source: Das, S. et al

CSIR-CMERI Develops Next-gen Metal-air Batteries

- Chemists at CSIR – Central Mechanical Engineering Research Institute (CMERI) in Durgapur, West Bengal, have developed a zinc-air battery with a novel electrocatalyst, which they claim can enhance the battery's efficiency.
- The battery can be used in smartphones and flexible wearables, according to the researchers.
- Conventional metal catalysts are costly and unstable.
- The rechargeable battery could power the LCD display of the kind used in normal digital alarm clocks.

CSIR-IITR Takes the Lead in Monitoring Non-degradable Chemicals

- Per- and polyfluoroalkyl substances or PFAS, called 'forever chemicals' because of their ability to resist degradation are rapidly emerging as an environmental nuisance.
- They are used everywhere from non-stick cookware and industries to firefighting material and textiles.
- CSIR- Indian Institute of Toxicology Research (IITR) in Lucknow has now taken up the mantle of tackling PFAS contamination.
- IITR is working on PFAS detection technologies and on policies regarding PFAS.
- According to Dr. Bhaskar Narayan, Director of IITR, the main challenge regarding PFAS is lack of data.
- For PFAS to be considered at the policy level, bodies like the Food Safety and Standards Authority of India (FSSAI) need to be shown evidence regarding seepage of PFAS in farm produce, food processing lines and in water run-off and sewage.
- Toward this end, IITR is working to track PFAS in water, food packaging materials and other things.

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CSIR-IGIB Research Sheds Light on a Brain-gut Connecting Highway in Roundworms

- **It is said that the food we consume affects everything from our mood to our lifespan.**
- **Now a new study by CSIR- Institute of Genomics and Integrative Biology (IGIB) in the national capital, might have just found out how nutrients from food affect the gut and the brain.**
- **They conducted the study on C. elegans, a transparent roundworm about 1 mm in length that thrives in soil in moderate weather conditions.**