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Experts to discuss benefits of membrane technology

CSIR-CSMCRI

10th July , 2024

The CSIR-Central Salt & Marine Chemicals Research Institute (CSMCRI) in Bhavnagar will host the three-day International Conference on Materials and Membranes for Water and Energy (ICMMWE-2024) from Jul 10.

The event will feature over 60 invited talks and see participation from more than 250 delegates representing countries like Japan, the UK, South Korea, Russia, Australia, UAE, Singapore, Israel, and India. Research students from various CSIR laboratories, IITs, NITs, Central and State Universities are also set to present their research through oral and poster sessions.

Professor T Pradeep from IIT Madras will deliver the inaugural lecture to kick off the conference.

Dr. Kannan Srinivasan, Director of CSIR-CSMCRI said, “This event will play a significant role in providing scientific and technical support not only to Indian user industries but also to international counterparts.”

The conference aims to facilitate discussions and collaborations that will drive advancements in the fields of water purification, renewable energy, and green hydrogen technology.

Dr Puyam Singh, chief scientist and convener of the event said, “As India aspires to become a leader in innovations in membrane technology, renewable energy and emerging materials in water purification and treatment and green hydrogen, the knowledge sharing and discussions among the stakeholders is the dire necessity.”

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[Times of India](#)

‘High antimicrobial resistance in city sewage’

CSIR-IICT

10th July , 2024

A recent study by city-based Indian Institute of Chemical Technology (IICT) has uncovered alarming levels of antimicrobial resistance (AMR) in sewage in Hyderabad, particularly in winter. The study, which was conducted in Tarnaka, Habsiguda and Lalaguda areas, has highlighted serious health implications.

The study, ‘Temporal dynamics and persistence of resistance genes to broad-spectrum antibiotics in an urban community’, published in Nature, revealed that AMR was being aggravated by human activities.

The random consumption of antibiotics and discharge of untreated wastewater into environment were key factors in proliferation of antibiotic resistance genes (ARGs).

IICT scientists Yamini Javvadi and S Venkata Mohan analysed 123 ARGs and 13 mobile genetic elements in wastewater using quantitative real-time PCR. Over five months from Dec 2021 to April 2022, researchers sampled sewage every month to assess the diversity and temporal dynamics of ARGs. The results showed that approximately 50% of the tested ARG subtypes were consistently detected each month, with a frequency ranging from 52% to 61%.

Antimicrobials including antibiotics, antivirals, antifungals, and antiparasitics are crucial for preventing and treating infections in humans, animals and plants. However, AMR occurs when bacteria, viruses, fungi and parasites no longer respond to these medicines, rendering treatments ineffective and leading to more severe and prolonged illnesses.

Researchers in the current study detected clinically significant genes capable of triggering resistance to third and fourth generation beta-lactam antibiotics, aminoglycoside, tetracycline and multidrug classes. These genes contribute significantly to core and persistent resistance.

Researchers said the study provided insights into seasonal fluctuations of ARG distribution, offering evidence to guide AMR control policies and promote responsible antibiotic use.

Earlier studies by IICT in the same localities had found that 70% of examined ARGs were positively detected, with nine out of 10 targeted ARG classes and 28 out of 52 antibiotics identified. Opportunistic pathogens such as pseudomonas and human infection-causing microbes such as acinetobacter were also found, indicating a high magnitude of resistance in the study sites.

The recent research emphasised that the intensity of resistance in the community was significant, with resistance detected in eight of the nine major ARG classes tested. The number of genes detected varied from month to month, highest being found in March and lowest in Dec.

Odisha farmer group, CSIR institute in pact to promote floriculture

CSIR-NBRI

09th July , 2024

Sabuja Sanatanpali Farmer Producer Company Limited (SSFPCL), Odisha's first floriculture-based farmer producer organisation (FPO), has signed an MoU with the Council for Scientific and Industrial Research (CSIR) - National Botanical Research Institute (NBRI), Lucknow, to promote research in floriculture.



Facilitated by consulting firm Palladium, the collaboration will focus on enhancing crop diversity, understanding plant-environment interactions, and applying biotechnological approaches for plant improvement to promote economic viability.

The FPO is among the first in Odisha to incorporate institutional applied research in its operational model to adapt to climate change, and boost flower production and marketing efforts.

Odisha, with 6,500 hectares dedicated to floriculture, produces approximately 24,800 tonnes of loose flowers and about 5,500 lakh cut flowers annually. However, this output meets only 10 per cent of the state's demand, and it sources the rest from major centres like Kolkata, Bengaluru, Delhi, and Hyderabad. This shortfall presents a lucrative opportunity for local entrepreneurs to venture into floriculture, a sector poised for growth.

Established in 2021 by Palladium as a technical support unit and supported under the 'Formation and promotion of 10,000 FPOs under CSS scheme' by NABARD, SSFPCL is located in the Jujumura forest area of Sambalpur district.

The organisation boasts over 1,200 small and marginal farmer members, with women comprising nearly 50 per cent, and overall benefits about 3,500 farmers. Besides floriculture, SSFPCL sells a range of agricultural products, including mangoes and vegetables such as cabbage, chilli, cauliflower, and okra, produced by small-holder farmers.

Chandra Sekhar Mohanty, Senior Principal Scientist at CSIR-National Botanical Research Institute, said, “Technical and scientific support will be provided to the farmer producer company. This includes quality planting materials, introduction of new plant varieties, performance evaluation in the local environment, training in agri-horticultural practices, and production of value-added products. These efforts will promote crop diversity and support the sustainable economic growth of the FPO.”

Biswajit Behera, Associate Director, Palladium India, said, “Accelerating inclusive business growth for the FPOs through promotion of climate-smart agriculture models has been the key approach of Palladium. When we supported the SSFPCL in 2021, we had set a clear vision — to promote it as one of the model FPOs demonstrating women’s economic empowerment through farmer collectives. It’s heartening to see emerging FPOs like Sabuja Sanatanpali integrating applied and scientific research through partnership with Council for Scientific and Industry Research - NBIR Govt of India in their production processes to enhance quality of production, respond to lower productivity due to climate change, and aiming for higher export markets. We aim to take it forward, keeping market systems aligned.”

The Council of Scientific and Industrial Research (CSIR) and MS Swaminathan Research Foundation (MSSRF) signs Memorandum of understanding (MoU)

CSIR

09th July , 2024

The Council of Scientific and Industrial Research (CSIR) and the M. S. A Research Foundation (MSSRF) entered an MoU to work together for livelihood generation among rural, tribal, and farming communities. The MoU was signed by Dr. N. Kalaiselvi, DG, CSIR and Dr. Soumya Swaminathan, Chairperson, MSSRF. Senior officials from CSIR and representatives of MSSRF witnessed the signing of the MoU.



Speaking on the occasion, Dr. N. Kalaiselvi, DG, CSIR expressed that although CSIR labs disseminate technologies developed in the labs to potential users, the outreach, especially in the societal sector, would be enhanced through joining hands with organizations such as MSSRF, which works at the grassroot level.

Dr Soumya Swaminathan, Chairperson, MSSRF stated that the Foundation, in its efforts to reach out to the tribal and vulnerable communities, is seeking select low-cost, affordable and potential technologies and technical support from CSIR laboratories as a technology facilitating partner under this umbrella MoU since the tribals or various other such groups are not able to directly approach CSIR labs due to many inherent reasons such as geographical location, language of communication and lack of required resources.

The MoU entails creating a framework and meaningful association for the transfer of affordable, proven and selected technologies with societal relevance available across the CSIR laboratories/ institutes and mentoring the SHGs/NGOs/FPOs and other voluntary

organizations selected by MSSRF for livelihood generation and empowerment of women, tribal population.

CSIR, with a vision to pursue science which strives for global impact, technology that enables innovation-driven industry and nurture transdisciplinary leadership thereby catalysing inclusive economic development for the people of India, undertakes R&D in outcome driven mode in diverse areas such as i) Healthcare; ii) Agri, Nutrition & Biotechnology; iii) Energy and Energy devices; iv) Chemicals, Leather and Petrochemicals; v) Mining, Minerals, Metals and Materials; vi) Civil infrastructure & Engineering; and vii) Aerospace, Electronics and Instrumentation & Strategic Sector; viii) Ecology, Environment, Earth Sciences and Water.

MSSRF, a non-profit trust registered under the Indian Trusts Act 1882 and recognised by the Department of Scientific and Industrial Research, Government of India as a Scientific and Industrial Research Organisation, focuses specifically on tribal and rural communities with a pro-poor, pro-women and pro-nature approach. The Foundation applies appropriate science and technology options to address practical problems faced by rural populations in agriculture, food and nutrition through its Sub-Centres and Field Stations across the country.

Hyderabad Scientist selected for Prestigious National Geoscience Award 2023

CSIR-NGRI

09th July , 2024

City -based Dr. B. Prasanta K. Patro, Chief Scientist at the CSIR-National Geophysical Research Institute (NGRI) in Hyderabad, has been selected for the prestigious National Geoscience Award 2023 by the Ministry of Mines, Government of India. His significant contributions to the fields of Geophysics and Applied Geophysics. Dr. Patro's journey in science began with a B.Sc. from Berhampur University in Odisha, followed by an M.Sc. from Andhra University in Visakhapatnam. He later joined NGRI and earned his Ph.D. from Osmania University in Hyderabad. His research focuses on the resistivity structure of the Earth's crust and upper mantle using the magnetotelluric (MT) method, which utilizes electromagnetic induction to gather data.

Resistivity is a crucial parameter in geophysics, providing insights into the presence of fluids and minerals within the Earth. Dr. Patro's studies have offered valuable information on seismotectonics and resource exploration, such as hydrocarbons and geothermal energy. His application of advanced MT techniques has tackled various geophysical challenges, revealing diverse electrical structures in the crust and lithosphere of South and Central India, particularly in the Deccan Volcanic Province and Southern Granulite Terrain. More recently, Dr. Patro's research has focused on the tectonics of the Himalayas, also using the MT method. He has been developing new 3-D inversion techniques to enhance the interpretation of magnetotelluric response functions.

Throughout his career, Dr. Patro has received several awards, including the Krishnan Gold Medal and Anni Talwani Memorial Prize from the Indian Geophysical Union. He has also been awarded post-doctoral research fellowships at Oregon State University, the Japan Science Promotion Society (JSPS) in Tokyo, and the BOYSCAST fellowship from the Government of India. Dr. Patro's ongoing work continues to push the boundaries of geophysics, solidifying his status as a distinguished scientist in his field.

Pruning Pollution: CSIR-NCL Translating Plastic to Diesel

CSIR-NCL

08th July , 2024

The National Chemical Laboratory (NCL), situated in Pune, India, is celebrated as a premier research institution under the auspices of the Council of Scientific and Industrial Research (CSIR). Since its establishment in 1950, NCL has forged a distinguished path in chemical research and innovation, encompassing diverse scientific disciplines such as organic chemistry, materials science, chemical engineering, and biotechnology. NCL's world-class facilities and cutting-edge research initiatives magnetize top-tier scientists and researchers from around the globe. The laboratory has earned international acclaim for its pioneering contributions in green chemistry, polymer science, and catalysis. Collaborating closely with industry partners, NCL is at the forefront of developing sustainable technologies and innovative solutions to address complex industrial challenges.

Beyond its research endeavors, NCL nurtures talent and disseminates knowledge. It hosts advanced training programs and cultivates a vibrant academic environment that fosters interdisciplinary collaboration and intellectual growth. The institution's prolific output of patents and publications underscores its commitment to advancing scientific knowledge and shaping the future of the chemical sciences on a global scale. With a steadfast commitment to innovation, sustainability, and scientific excellence, NCL continues to drive technological advancements that have far-reaching impacts on society and industry. Its contributions play a pivotal role in enhancing India's socio-economic landscape and contributing to global scientific progress.

In an exclusive interview with The Interview World, Dr. Samir H. Chikkali, Senior Principal Scientist & Prof. (ACSIR) in the Polymer Science and Engineering Division at CSIR-NCL, sheds light on his groundbreaking project focused on converting waste plastic into diesel. Dr. Chikkali discusses the project's innovative aspects, its journey towards commercialization, the significant market opportunities it presents, and its potential to mitigate pollution and reduce

the carbon footprint. His insights highlight NCL's proactive approach to translating research into impactful solutions that address pressing environmental challenges while fostering sustainable development.

Q: Could you please explain the development of your waste plastic to diesel model? Specifically, what kind of research and development efforts have you undertaken to ensure that the end product is both highly efficient and economically viable?

A: In our plastic-to-diesel project, our primary goal is to recycle polyethylene and polypropylene waste effectively. These two types of polymers are sourced and processed at the IIP Dehradun facility, which operates at a scale of one tonne per day. The process includes two critical stages, meticulously designed to transform these materials into high-quality BS6 grade diesel. This initiative not only addresses environmental concerns but also contributes to sustainable fuel production.

Q: Have you pursued or are you planning to pursue the commercialization of this patent?

A: We've developed this process in partnership with the Gas Authority of India Limited (GAIL). It's currently operational at a one-tonne per day capacity, with potential for scalability up to 10 tonnes per day or beyond. This innovative solution is now open for licensing opportunities, offering industry partners the chance to integrate cutting-edge technology into their operations. Although not yet commercialized, it stands poised for rapid deployment through strategic licensing agreements.

Q: What are the key market opportunities you foresee in this industry, and how do you plan to leverage them?

A: With sustainability taking the forefront of global agendas, numerous opportunities emerge for innovative solutions. Addressing the pressing issue of waste plastic presents substantial potential for our advanced solution, positioning us at the forefront of sustainable practices and market leadership in environmental stewardship.

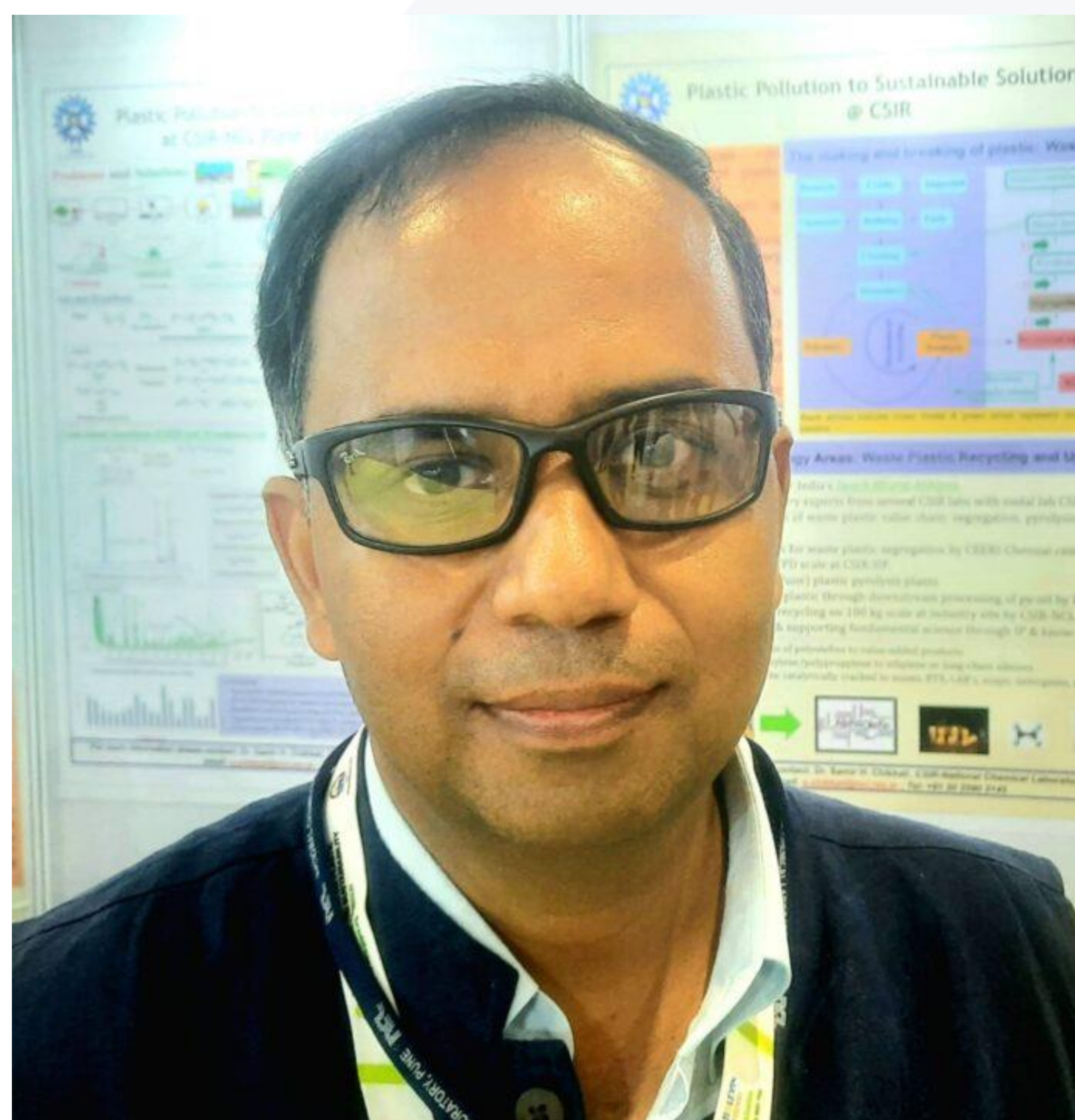
Q: How do you envision your solution addressing the plastic pollution problem in the country?

A: Our commitment extends beyond rhetoric—we are poised to tackle plastic pollution head-on. Leveraging cutting-edge CSIR-certified segregation technology and other trusted sources, we will transform polyethylene and polypropylene waste into diesel fuel. This innovative initiative underscores our dedication to sustainability, aligning environmental stewardship with operational excellence. By repurposing waste materials into valuable resources, we not only mitigate ecological impact but also drive forward-thinking solutions that benefit both our organization and the planet.

Q: Given the rising global carbon footprint, do you believe your plastic conversion technology will also contribute to addressing this critical environmental issue?

A: In every operational process, energy consumption inevitably leads to a carbon footprint. The pivotal consideration is the origin of this energy. At our facility, we have implemented an integrated approach where emissions produced are recycled to heat our operations, showcasing our dedication to sustainable practices.

While this integration represents a significant step towards minimizing our environmental impact, it's essential to acknowledge that our operations still necessitate energy consumption, which, in turn, involves carbon emissions from energy production elsewhere. This ongoing balance underscores our continuous efforts to mitigate environmental impact while striving for greater efficiency and sustainability in our operations.



WBPCB ties up with NEERI, IIT & TERI to study urban pollution

CSIR-NEERI

08th July , 2024

With an aim to tackle urban pollution, the West Bengal Pollution Control Board (WBPCB) has tied-up with TERI, NEERI, and IIT-Delhi for conducting source apportionment studies across six non-attainment cities, including Kolkata, Howrah, Barrackpore, Haldia, Asansol and Durgapur.

The studies are in the final stage. They aim to identify the sources of each pollutant, enabling targeted measures to neutralize pollution at its origins.

The studies include preparation of emission inventories, monitoring of ambient air quality for various pollutants at selected locations (7 to 10 locations with different land use), chemical speciation of PM 10 and PM 2.5 as well as source emissions, application of receptor (CMB8) & dispersion models to assess the contribution from various sources, future projections and evaluation of various control options to develop cost-effective plans. While TERI has been entrusted with the source apportionment study for Kolkata and Howrah. NEERI will do for Barrackpore and Haldia and IIT-Delhi for Asansol and Durgapur.

Ensuring Food Security: India and Australia Spearhead Innovations in the Global Wheat Industry

CSIR-CFTRI

08th July , 2024

Global wheat leaders convened at the Global CEO Conclave on wheat to address pressing challenges and forge strategic partnerships in the wheat industry. Highlighting the pivotal roles of India and Australia, Mr. John Southwell, Trade and Investment Commissioner at the Australian Trade and Investment Commission, emphasized collaborative efforts to bolster food security



through sustainable practices and technological advancements. Mr. John Southwell, Trade and Investment Commissioner at the Australian Trade and Investment Commission, delivered an insightful presentation during the Global CEO Conclave 2024, focusing on “Trade and Investment Opportunities in South Asia’s Agrifood Sector.” His address underscored the critical importance of fostering international partnerships to bolster the supply of wheat and wheat products, ensuring stability and sustainability amidst global economic fluctuations and evolving consumer demands.

Southwell began by highlighting South Asia’s pivotal role in the global agrifood sector, particularly in wheat production and consumption. He emphasized the region’s vast potential for agricultural development, driven by its fertile lands and diverse agro-climatic conditions. Recognizing India’s position as the world’s second-largest wheat producer and a key player in global food security, Southwell outlined strategic avenues for international collaboration aimed at enhancing productivity and resilience across the agrifood value chain. Southwell’s discourse was the need for robust trade and investment frameworks that promote cross-border cooperation. He identified key areas ripe for investment, including agricultural infrastructure development, technology transfer, and sustainable farming practices. By leveraging Australia’s

expertise in agricultural innovation and South Asia's burgeoning agricultural markets, Southwell proposed joint initiatives that could optimize resource use, improve yield outcomes, and ensure high-quality wheat production to meet regional and global demands. Moreover, Southwell highlighted the significance of trade agreements and policy frameworks in facilitating smoother agricultural trade flows. He emphasized the role of bilateral and multilateral agreements in reducing trade barriers, enhancing market access, and promoting fair and transparent trading practices. Such measures, he argued, are crucial for creating a conducive environment for long-term investments and sustainable growth in the agrifood sector. Southwell stressed the importance of knowledge exchange and capacity-building initiatives. He proposed collaborative research projects aimed at developing climate-resilient wheat varieties, improving water management techniques, and implementing precision agriculture technologies. These initiatives, he noted, not only enhance agricultural productivity but also contribute to environmental sustainability and resource conservation in the face of climate change challenges.

The conclave, inaugurated by Mr. Pramod S Jain, President of the Roller Flour Millers' Federation of India (RFMFI), showcased advancements in food technology, emphasizing innovations in milling, baking, and food fortification. Dr. Sridevi Annapurna Singh of CSIR-Central Food Technological Research Institute, Mysuru, underscored the transformative impact of these technologies on wheat products' quality and nutritional value. Mr. Preet Pal Singh, IFS, Joint Secretary at the Ministry of Food Processing Industries (MoFPI), Government of India, outlined governmental initiatives to bolster the food processing sector, reinforcing India's commitment to sustainable agriculture and enhanced food security. Mr. Raju Kapoor, Director of Industry and Public Affairs at FMC Corporation, discussed the importance of building resilient supply chains for sustainable wheat production and distribution. He highlighted the role of integrated pest management, sustainable farming practices, and innovative agricultural technologies in ensuring a resilient and sustainable supply chain.

This session focused on the evolving landscape of wheat processing and the challenges faced

in ensuring quality, safety, and sustainability. Mr. Anand Ramanathan, Partner at Deloitte, analyzed the evolving landscape of wheat processing, highlighting emerging trends and innovative practices. He discussed the impact of digital transformation, automation, and sustainability initiatives on the wheat processing industry. Prof. Arun K. Joshi, Managing Director of the Asian Wheat Initiative at CIMMYT, discussed global wheat production trends and their implications for food security. He highlighted the role of international research collaborations, technology transfer, and capacity-building programs in enhancing wheat productivity and food security. Ajay Goyal, Chairman of WPPS, expressed optimism about the conclave's outcomes, emphasizing the critical role of fortification in public health and global food security. "The insights shared underscore our commitment to innovation and collaboration in the wheat industry. Discussions on fortification and economics provide a blueprint for sustainable growth. Moving forward, the strategies discussed will guide our efforts to promote wheat industry growth, foster innovation, and maximize contributions to global food security."

North India lost 450 cubic km of groundwater in 2 decades: Study

CSIR-NGRI

07th July , 2024

About 450 cubic km of groundwater was lost in northern India during 2002-21, and climate change will further accelerate its depletion in the years to come, according to a new study from IIT Gandhinagar. This is about 37 times the quantity of water the Indira Sagar dam — India's largest reservoir — can hold at full capacity, lead author Vimal Mishra, Vikram Sarabhai chair professor of civil engineering and earth sciences at IIT Gandhinagar, said.



Using on-site observations, satellite data and models, researchers found that across north India, rainfall in the monsoon season (June-September) has reduced by 8.5 per cent from 1951-2021. Winters in the region have become warmer by 0.3°C over the same period, they found.

The team, also comprising researchers from the National Geophysical Research Institute (NGRI) in Hyderabad, said lower rainfall during monsoon and warming of winters will increase irrigation water demand and reduce groundwater recharge, further stressing the already depleting groundwater resource in north India.

While a drier monsoon leads to more reliance on groundwater to sustain crops during rainfall-deficit periods, warmer winters result in relatively drier soils, again requiring more irrigation — something the researchers observed during the unusually warm winter of 2022, the fifth warmest for India since the India Meteorological Department (IMD) started keeping records in 1901.

"The accelerating trend of depleting groundwater is expected to continue as the planet warms because even though climate change causes more rainfall, most of it is projected to occur in the form of extreme events, which does not support groundwater replenishment," Mishra told PTI.

The shortage of monsoon rainfall followed by warming winters, both driven by climate change, is projected to cause a "substantial decline" by about 6-12 per cent in groundwater recharge. The study's manuscript, accepted for publishing in the journal *Earth's Future*, was shared exclusively with PTI.

"For groundwater to get recharged, we need low-intensity rainfall spread over more days," Mishra explained. Changes in groundwater levels are known to be largely dependent on rainfall received during summer monsoons and groundwater pumped out for irrigating crops during their respective growing seasons — June-September for kharif crops and December-March for rabi crops.

The combined effect of intensified irrigation demands and reduced groundwater recharge in the future, therefore, can put more strain on an already fast-depleting resource, he said. The findings challenge the optimistic perception that climate change-driven increase in rainfall will solve our water problems, the lead author of the study said.

In 2009, a monsoon drier by almost 20 per cent, followed by an unusual winter that was warmer by a degree, had "detrimental" effects on groundwater storage, reducing it by 10 per cent. Moisture lost from soil during winters was also found to have significantly increased over the past four decades, suggesting the potential role of warming and stepped-up demands in irrigation.

The authors have projected that under continued warming, monsoons drier by 10-15 per cent and winters warmer by 1-5°C will together spike irrigation water demands by 6-20 per cent. A warming of 1-3°C across north India will also hamper groundwater replenishment by 7-10

per cent, they said. "The findings have policy implications as the water crisis witnessed during this year's heatwave highlights the need for cautious and judicious exploitation of groundwater," Mishra said.

The author said groundwater, vital for food and water security in India, will become a more crucial resource in a warmer climate because of increased demands for irrigation and industry alike.

"This is because surface water storage, such as in reservoirs and dams, is insufficient to meet demands during summer, as seen in cities such as Delhi and Bengaluru. Not paying attention to the resource could pose water security challenges in the future," Mishra added.

DDC Pulwama visits CSIR-IIIM, Field Station Pulwama

CSIR-IIIM

06th July , 2024

The District Development Commissioner (DDC) Pulwama, Dr. Basharat Qayoom today visited the Field Station Bonera, Pulwama of the CSIR – Indian Institute of Integrative Medicine and conducted a comprehensive review of the various activities and societal outreach programs being implemented at the station.



During his visit, Dr. Basharat interacted with the scientific and technological staff and toured different sectors of the station.

Dr. Shahid Rasool, Senior Scientist and Incharge of the Field Station, informed the DDC that the station, spread over more than 200 acres, focuses on research, development, and technology development for region-specific medicinal, aromatic, nutraceutical and floricultural crops. These efforts aim at commercial-scale production, processing, post-harvest management, and value addition.

Known for its extensive fields of high-value aromatic crops such as Lavender, Rose, Rosemary, and Rose Scented Geranium, the station actively promotes their expansion across the region through various farmer-oriented and societal outreach initiatives under the Ministry of Science and Technology.

Dr. Basharat emphasized the significant role of the Council of Scientific and Industrial Research (CSIR) in shaping the developmental landscape of the country through its scientific and technological capabilities. He commended the scientists at CSIR-IIIM field station Pulwama for their contributions to regional development and affirmed his support for the successful execution of the station's

programs and projects. During his tour, the DDC visited the apiculture unit and distillation facility, where farmers' Lavender harvests were being processed for Lavender oil extraction. The Lavender production initiative provides employment opportunities for local women.

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