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दि लेदर पोस्ट
The Leather Post

सीएसआईआर-केन्द्रीय चर्म अनुसंधान संस्थान
CSIR-Central Leather Research Institute

LERIG Conclave 2025

Director's Message

Greetings and Namaskar to the Stakeholders of the leather sector

Dr K J Sreeram
Director, CSIR-CLRI

लेदर पोस्ट के प्रिय पाठको,

चर्म उद्योग स्थायित्व और नवोन्मेषण के बीच संतुलन बनाए रखते हुए समय के महत्वपूर्ण पड़ाव पर है। संस्थान और क्षेत्र के बीच विकास के लिए सहयोग देखना उत्साहजनक है। भारत सरकार की हाल की बजट घोषणाओं ने कई लोगों को प्रेरित किया है। सीएसआईआर–सीएलआरआई प्रौद्योगिकी में प्रगति को जारी रखता है, विशेष रूप से पश्चिम बंगाल के एमएसएमई विभाग के साथ फरवरी 2025 के समझौते ज्ञापन के अनुसार कलकत्ता लेदर कॉम्प्लेक्स में एनएबीएल–मान्यता प्राप्त परीक्षण प्रयोगशाला की स्थापना की जा रही है। इसके अतिरिक्त, क्षेत्रीय केंद्र जालंधर में हाल ही में एक प्रशिक्षण कार्यक्रम आयोजित किया गया था, जिसका उद्देश्य कौशल विकास के माध्यम से जम्मू और कश्मीर में बेरोजगार महिलाओं को सशक्त बनाना था।

लेदर पोस्ट का यह अंक शिक्षा और उद्योग के बीच सकारात्मक संबंध को उजागर करता है।
इस अंक को पढ़ने का आनंद प्राप्त करें!

The leather industry is at a pivotal moment, balancing sustainability, and innovation. It is encouraging to see collaborations between the institute and the sector for growth. The recent budget announcements from the Government of India have inspired many. CSIR-CLRI continues to advance technology, notably with the February 2025 MoU with West Bengal's Department of MSME, establishing a NABL-accredited testing lab in the Calcutta Leather Complex. Additionally, a recent training program at RC Jalandhar aimed to empower unemployed women in Jammu & Kashmir through skill development.

This issue of The Leather post highlights the positive connection between academia and the industry.

Happy Reading!

Activating Lipid Metabolism: Apigenin-Resveratrol on White Adipocyte Trans-Differentiation

From the first significant publication on adipose tissue (AT) in the year 1837 to over 139,000 citations in 2019, research on adipocytes has come a long way. The lack of scientific interest in Adipose tissue was due to the misconception that AT is simply an inert energy storage depot. Recent discoveries, however, point to AT's role in whole-body metabolic signaling. The central role of adipocytes in obesity-related complications, a metabolic disorder and a global pandemic has renewed the interest further.

Adipose tissue is basically of 2 hues, white adipose tissue (WAT) and brown adipose tissue (BAT) and is visibly distinguishable based on tissue colour. The white and brown adipocytes exhibit physiological differences with specialized tissue functions. White adipose tissue is critical for energy storage, endocrine communication, and insulin sensitivity. It is the largest in volume found in most mammals including humans. Brown adipose tissue is mostly present in mammals postnatally and during hibernation. Brown adipose tissue uses energy for non-shivering heat production, which is critical for body temperature maintenance.

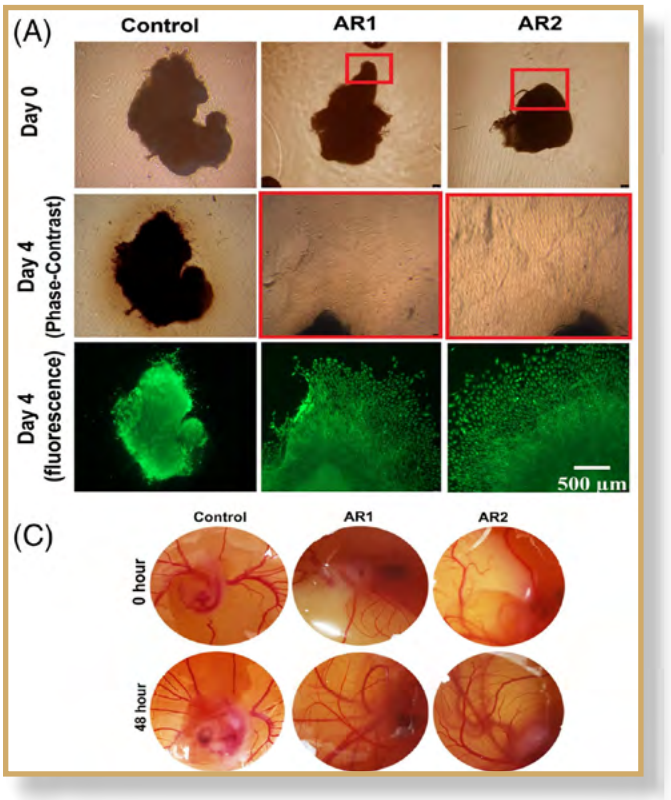
Certain adipocytes present in white adipose tissue (WAT), when stimulated, acquire a brown fat-like phenotype, leading to increased heat production. Browning of white adipocytes has emerged as a promising therapeutic approach for addressing obesity. Natural bioactive compounds are known to induce browning and can be an effective strategy to control unregulated lipid storage. However, relying on a single bioactive has proven insufficient in obese individuals during human trials, as they primarily activate only a single biochemical pathway. Targeting multiple pathways can both safe and effective in the adipose browning process. Researchers at CSIR-CLRI have investigated the combinatorial effect of bioactives, namely apigenin and resveratrol, to activate multiple pathways for effective trans-browning of white adipocytes. Results of their study showed adipose browning was more profound than the single bioactive.

A combination of apigenin and resveratrol activated multiple signaling pathways to induce angiogenesis-mediated browning in primary white adipocytes isolated from obese mice. Activation of PI3K signaling via estrogen receptor-alpha-dependent pathway resulted in simultaneous activation of angiogenesis and trans browning in white adipocytes. The findings of this study provide valuable insights into the potential use of bioactives in combination to improve the overall health of obese subjects.

Sreelekshmi Sreekumar, Manikantan Syamala Kiran

Angiogenic potential of control and Apigenin and Resveratrol (AR)-treated adipocyte secretome.

Biofactors Volume51, Issue1, e2111, January/ February 2025
https://doi.org/10.1002/biof.2111



ZWITTER-ZWITTER: REPEL LITTER, MAKE LEATHER BETTER!

Researchers at CSIR-Central Leather Research Institute propose a zwitter-ionic polymer, matching with collagen's zwitter-ionic form, for Aluminium (Al)- & Zirconium (Zr)- tanning/post tanning purposes. Yes, the research group has synthesized a multifunctional retanning and fatliquoring agent using a hydroxyethyl methacrylate (HEMA) monomer by modifying the hydroxyl group to carboxyl and long-chain hydrocarbon along with quaternary ammonium monomer. The chrome-free innovation stamps its ingenuity with a multi-fold increase in metal (Al & Zr) uptake, ~ 80^0C wet heat resistance, uniform pore distribution, better organoleptic properties, up to 97% dye uptake, bonus anti-bacterial properties, higher biodegradability@0.62 and outclasses the state-of-the-art in chrome-free tanning/post tanning! Speaking the zwitter-ionic language as collagen has stemmed the above breakthrough!

Modern leather manufacturing involves enormous inorganic and organic chemicals, also a huge volume of water. Around 130 different chemicals are used in the processing of leather. Post tanning chiefly yet arguably averages a chemical consumption of 360.2 kg per ton of shaved leather. Retanning and fatliquoring consume chemicals the largest of all steps. Post tanning is thirsty of around 8.6 cubic meters of water per ton of shaved leather. Post tanning waste stream is poorly biodegradable, highly conductive and salt-ridden. At this precarious and unenviable juncture, the above innovation appropriately prioritizes the post tanning conundrum without any ado!

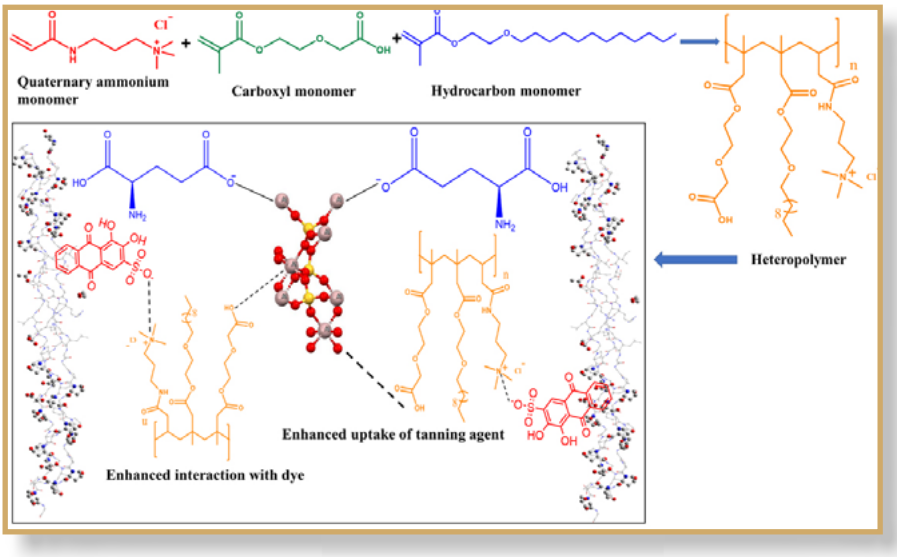
To connoisseurs and scientists alike, collagen is a '*wonder*' material, not just '*wonderful*'. Collagen is simply omnipotent with its non-linear applications in both untanned and tanned forms. In short, collagen is like an elephant, dead or alive, which is a valuable asset! In the realm of and through the lenses of physical- & bio-chemistry and biophysics, its versatility is striking and staggering in terms of its three-dimensional architecture and assembly, long-range ordering/ periodicity, viscoelasticity, breathability, variance of operating pH ranges and 'charged' reactivity. The impulse to preserve such matchless properties of collagen drove mankind to play with the extremes of collagen instead of its median. Perhaps, that led to the less sustainable unit processes of leather making that were energy-intensive, resource-intensive and thus litter-prone. Every single unit process that seemed single-use, single-object through single-charge chemicals vis-a-vis zwitter-ionic agents with multiple functionalities, stands testimony to such a narrative.

Let the de-puzzling of collagen be worded with zwitter-ionic language of heteropolymers and other smart chemicals in the days to come and embrace sustainability!

Chandrasekar Inbasekar, Nishter Nishad Fathima

Multifunctional amphoteric heteropolymer for chromium free sustainable leather process

Journal of Applied Polymer Science, 2024, 141(29), e55673
https://doi.org/10.1002/app.55673



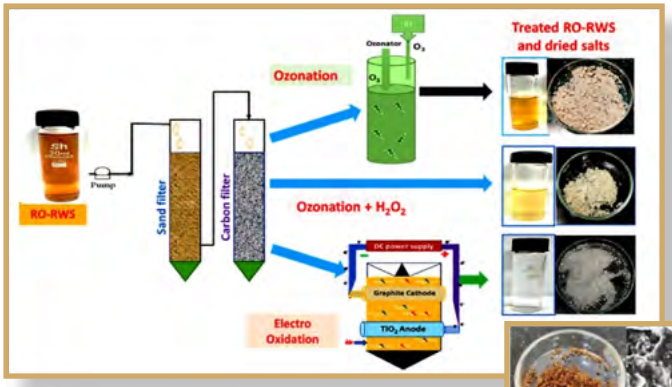
Management of Contaminated Salt in CETPs

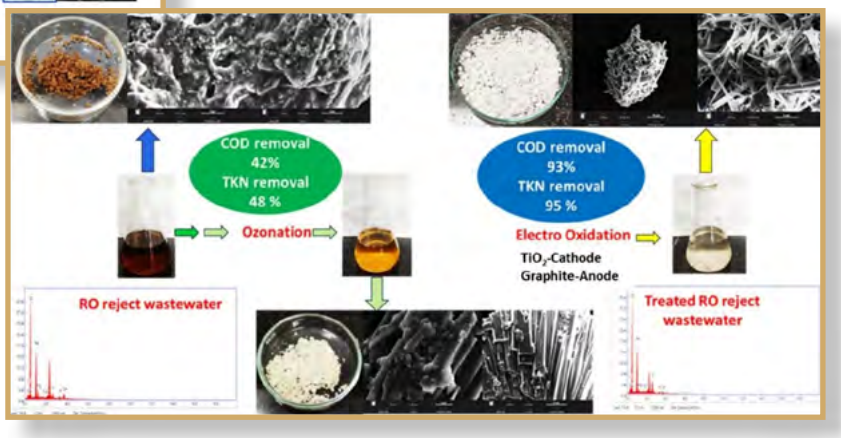
India produces nearly 2 billion square feet of leather in a year, making it one of the biggest exporters of finished leather. Traditional leather processing generates huge amounts of sodium chloride, besides other inorganic and organic salts. Conventional treatment of tannery wastewater in Common Effluent Treatment Plants (CETPs) involves physico-chemical Treatment, biological treatment and tertiary treatment. Reverse Osmosis (RO) water treatment has been employed for years in various industries to separate dissolved solids from water by forcing the water through a semi-permeable membrane. However, the process of reverse osmosis generates concentrated RO reject. The management of RO rejection, especially from Common Effluent Treatment Plants (CETPs), treating leather industrial waste streams is a challenging task due to the presence of high levels of chlorides and sulphates. Researchers from CSIR-CLRI have developed a sustainable treatment approach for the management of RO reject waste stream (RO-RWS) from CETPs by applying Advanced Oxidation Processes (AOPs) like ozonation, ozonation + H_2O_2 and electrooxidation techniques to achieve maximum organic removal efficiency. AOPs such as Ozonation (Oz), Ozonation with H_2O_2 (Oz-HP) and Electro-oxidation using TiO2 and Graphite electrodes (EOTiO2+Graphite) treatment systems eliminated 45 %, 54 % and 92.8 % of Chemical Oxygen Demand (COD.) and 32 %, 38 % and 78.7 % of Total Kjeldahl Nitrogen (TKN) respectively from RO-RWS at high Total Dissolved Solids (TDS) environment. SEM, along with EDX analysis, reveal that the salts recovered from Electrooxidation treated RO-RWS show better crystallinity than the salts recovered from untreated RO-RWS. The outcome of these experiments has shown that AOPs have promise for handling leather industry RO-RWS, which can significantly lessen the environmental effect of tanneries and contribute to a circular economy. The results can be used to treat RO reject at an industrial scale, which will improve both the environmental sustainability of the leather industry and the quality of treated water.

P. Maharaja, I. Athithyan, C. Karthiyayini, K. Sri Bala Kameswari

Evaluation of ozonation and electro oxidation treatment for the removal of organics and salt recovery from RO reject from leather industries: Sustainable approach for the management of contaminated salt in CETPs

Applied Catalysis O: Open, Volume 200, March 2025, 207028
https://doi.org/10.1016/j.apcato.2025.207028





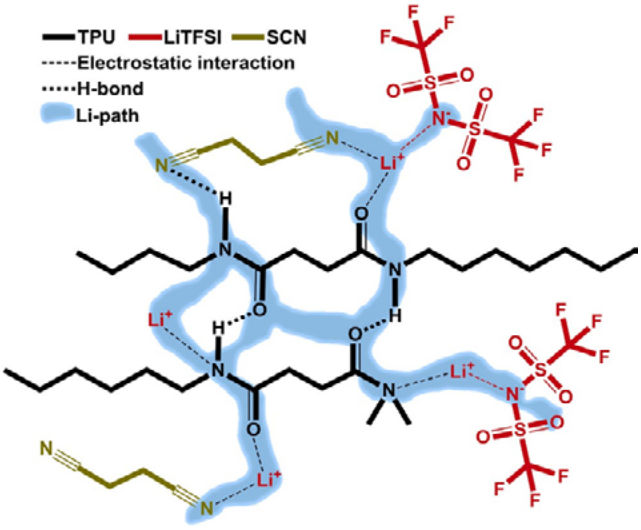
Solid Electrolytes for Solid-state Lithium Batteries

Batteries convert chemical energy directly into electrical energy. They are the main component in any electronic gadgets which are the actual energy source for the entire assemblies in those gadgets. Most of them, like scientific equipment (Handheld models & Mobile units), personal equipment (Mobile phones, watches, laptops), home appliances, etc., can function with the support of batteries only. Primary batteries [Types: zinc-carbon (Leclanché); zinc chloride; zinc-manganese dioxide; zinc-silver oxide; zinc-air; lithium-iron sulphide; lithium-manganese dioxide] and secondary (Rechargeable) batteries [Types: lead-acid; nickel-cadmium; nickel-metal hydride; lithium-ion] are commercially available for the regular uses. At the outset, lithium batteries are preferred for usage because of their overall performance. These batteries are being built based on solid polymer electrolytes. Polymer electrolytes are favoured in solid-state batteries due to their mechanical strength and improved electrode-wetting properties compared to conventional solid electrolytes. However, achieving a balance between key properties, such as mechanical stability, thermal stability, ionic conductivity, electrochemical stability, and room-temperature operation, remains a challenge. In this view, CSIR-CLRI researchers have collaborated and explored Thermoplastic Polyurethane (TPU) as a versatile, cost-effective polymer with tunable elastic and thermal properties. The objective was to optimize TPU-based solid polymer electrolytes (SPEs) for ionic conductivity while considering cost and demonstrating room-temperature cycling. Membranes were fabricated using TPU, LiTFSI, and SCN via solution casting and screened based on ionic conductivity and cost. Among the membranes tested, TPUL23S50 exhibited the highest ionic conductivity and lowest interfacial resistance with lithium metal. TPUL11S50 showed superior current capability and lithium transference number. Linear Sweep Voltammetry (LSV) revealed that TPUL23S60 had the best voltage stability. In full-cell tests, all membranes demonstrated excellent room-temperature cycling performance, with capacities close to theoretical values and strong retention. This study demonstrates that TPU-based polymers have the potential to surpass current polymer electrolytes. It offers efficient lithium-ion conduction and robust electrochemical performance, making them promising candidates for commercial solid-state batteries.

Deepak Kumar, Sellamuthu N. Jaisankar, K. Ramesha, Evan Kurian, Jayashree Pitchai, Soundarya Neelanarayanan

Thermoplastic polyurethane (TPU) based high-performing solid polymer electrolytes for solid-state lithium metal batteries

Journal of Energy Storage, 2025, 115, 115882**.**
https://doi.org/10.1016/j.est.2025.115882



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9	Fatrekar, AP; Vernekar, AA, A self-assembled nanozyme featuring precise active centers and topography exhibits controlled catalytic interplay with mitochondrial protein while regulating electron flow during bioinspired oxygen reduction, Journal of Materials Chemistry A, 2025, 13 (6), 4299-4308, 10.1039/d4ta06131d
10	Varghese, A; Jawahar, M; Prince, AA, LeaData a novel reference data of leather images for automatic species identification, Scientific Reports, 2025, 15 (1), 10.1038/s41598-025-88040-1
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MoU between CSIR-CLRI and MSME & T, Govt of West Bengal

On the side-lines of the 8 Bengal Global Business Summit (BGBS), a flagship event of the Government of West Bengal, aimed at attracting significant investments across industries such as manufacturing, IT, cement, leather, iron & steel, and textiles.

A Memorandum of Understanding (MoU) was signed between the CSIR-CLRI and the Department of Micro, Small & Medium Enterprises & Textiles (MSME & T), Government of West Bengal, on 6 February 2025 for the establishment and operation of a NABL-accredited Testing Laboratory for leather and footwear at the Calcutta Leather Complex (CLC), Bantala, West Bengal. The objective is to support industries, particularly those placed in CLC and around the Kolkata region, by offering physical and chemical testing services and certifications for leather, chemicals,

leather goods, both leather and non-leather footwear, gloves, upholstery, and allied products.

The MoU was exchanged between Ms. Maithrayee Ganguly, Joint Secretary of MSME & T, and Dr. K.J. Sreeram, Director of CSIR-CLRI, in the esteemed presence of Hon'ble Chief Minister of West Bengal, Ms. Mamata Banerjee. Participating in the panel discussion, Dr. K.J. Sreeram, Director, CSIR-CLRI shared his views on the issues of sustainability in the tanning sector.

A consultancy agreements were signed on 28 February, 2025, between CSIR-CLRI and M/s. Jama Corporation Pvt. Ltd., for Unit – II and Unit III, Kanpur Dehat for conducting a Water Audit for the tannery and Effluent Treatment Plant.

Indian National Young Academy of Science (INYAS)

CSIR-CLRI, in association with the Indian National Young Academy of Science (INYAS), has initiated a Research Lecture Series. The first in the series was held on 13 December 2024, sparking intellectual curiosity among the M.Sc., internship students and research scholars. Delivered by Prof. Sankarasekaran Shanmugaraju from IIT Palakkad, the talk was with innovative insights, and explored the fascinating world of supramolecular self-assembly, unravelling the formation of novel structures and functional materials. It further explored the potential applications of the findings in the development of advanced materials.

On 20 December 2024, a lecture by Dr. Manish Kumar Mishra, Scientist, CSIR-NCL Pune, focused on the intricate structure-property relationships that play a pivotal role in designing functional molecular materials. Through the talk, Dr. Mishra's brought out a fresh perspective to the challenges and possibilities in molecular material design.

The third in the series was by Prof. Sheshanath Bhosale from Central University of Karnataka, Kalaburgi. On 3 February 2025, Prof Bhosale spoke on the development of nano- and biotechnological tools using supramolecular chemistry. On 4 February 2025, Dr. Ketan Patel, Principal Scientist, CSIR-CSMCRI, Bhavnagar, spoke on designing functionalized microporous thin films for molecular separation and energy mineral extraction.

The INYAS Research Lecture Series at CSIR-CLRI successfully facilitated a spirit of intellectual exchange. With insightful lectures by distinguished experts in the field, the event inspired students and researchers to explore new frontiers in material science, inducing curiosity about scientific advancements.

Dr. Ketan Patel, Principal Scientist, CSIR-CSMCRI, Bhavnagar

Prof. Sheshanath Bhosale, Central University of Karnataka, Kalaburgi

Prof. Sankarasekaran Shanmugaraju, IIT Palakkad

Dr. Manish Kumar Mishra, Scientist, CSIR-NCL Pune

Bengal Global Business Summit (BGBS)

The 8th edition of the Bengal Global Business Summit (BGBS) 2025 held on 5-6 February 2025 at Kolkata, reinforced West Bengal's position as a rising economic hub. The state has been attracting significant investments across industries, including manufacturing, IT, cement, leather, iron & steel, and textiles.

A key highlight of the summit was the panel discussion on the leather industry held on 6 February, 2025. During the session, CSIR-CLRI and MSME West Bengal exchanged an MoU to establish a new testing laboratory at Calcutta Leather Complex Tanners Association (CLCTA). This initiative aims to strengthen the state's leather sector by enhancing testing infrastructure.

West Bengal's leather industry benefits from a skilled workforce, strategic geographic positioning, and well-developed infrastructure.

The state government has introduced several supportive policies to boost this sector. The Leather Complex Policy offers land at subsidized rates,

lowering initial capital costs for investors. Additionally, the Mega Leather Cluster Scheme provides financial assistance for infrastructure development, improving operational efficiency and scalability.

These efforts create a favourable investment climate, making West Bengal a leading destination for stakeholders in the leather industry.

Training Women Entrepreneurs in Leather Goods

The synergistic one-week training program on leather product making was organised by CSIR-CLRI & CSIR-IIIM at CLRI-Regional Centre, Jalandhar (RCJ) from 10-15 February, 2025. This program was flagged off at Jammu by the Hon'ble Union Minister Dr. Jitendra Singh on 8 February 2025 for the economic growth and livelihood generation, especially to the unemployed women of Jammu & Kashmir region.

The program was inaugurated by Dr K J Sreeram, Director, CSIR-CLRI & Dr Zabeer Ahmed, CSIR-IIIM, on 10 February 2025. During this one week, the participants were demonstrated leather product making and given hands-on experience. Industrial visits to the leather processing and product-making units in Jalandhar Leather Complex were organized. During the Valedictory Ceremony, Dr S V Srinivasan, Scientist-in-Charge & Dr Shahid Jibran, CEO, AIC-IIIM Bio Innovation Foundation, delivered the concluding remarks.

The Scienitst-in-Charge, thanked CSIR-IIIM and presented the participants with mementoes and efforts of the RCJ team. The event was attended by the staffs of CLRI, Regional Centre, Jalandhar, including Dr P

Sudhakara, Principal Scientist and Shri V Karthik, Principal Scientist. The coordinators of CSIR-IIIM and the participants expressed their complete satisfaction towards the training and the industry exposure.

Flagged off by the Honourable Minister of State for S & T and Earth Sciences, Dr. Jitendra Singh, the future women entrepreneurs of Jammu & Kashmir were warmly welcomed at CSIR-Central Leather Research Institute, Jalandhar Center. Director CSIR-CLRI and CSIR-IIIM welcomed them and training under the experts of CSIR-Central Leather Research Institute on leather product manufacture commenced. Presented the participants with mementoes and efforts of the RCJ team. The event was attended by the staffs of CLRI, Regional Centre, Jalandhar, including Dr P Sudhakara, Principal Scientist and Shri V Karthik, Principal Scientist. The coordinators of CSIR-IIIM and

the participants expressed their complete satisfaction towards the training and the industry exposure.

Monitoring Committee Meeting:

CSIR-Waste to Wealth Mission

The second monitoring committee meeting of the CSIR-Waste to Wealth Mission under the chairmanship of Prof. E.S. Dwarakadasa, former Professor, Indian Institute of Science, Banglore, with Dr K J Sreeram, Director CSIR-CLRI and mission Director was held on 10 February 2025 at CSIR-CLRI. During the interaction it was decided that under the mission, CSIR would focus on bringing out technologies that generate value-added products and chemicals from Industrial wastes.

CSIR-CLRI @ India International Leather Fair (IILF) 2025

CSIR-CLRI actively participated in the 38 edition of the India International Leather Fair (IILF) 2025, held during 1-3 February, 2025, at the Chennai Trade Centre. At the event, CSIR-CLRI showcased its latest technologies aimed at enhancing the sustainability of the leather sector. These innovations covered various areas, including leather processing, leather chemicals, leather products, and waste management solutions, with a strong emphasis on waste-to-wealth initiatives.

The institute presented its design sequence, "*Magic Moments Unite with Progressive Modernity to Create Tomorrow's Vibes*," which highlighted a fusion of traditional leather craftsmanship with contemporary design elements such as asymmetric cuts, metallic zippers, and laser-cut patterns inspired by digital aesthetics. Additionally, CSIR-CLRI participated in the Designer Fair, unveiling its Spring-Summer 2026 collection.

Smt. Supriya Sahu, IAS, Additional Chief Secretary to Government Health & Family Welfare Department, Government of Tamil Nadu, Shri. Vimal Anand, IRS, Joint Secretary, Department of Commerce Ministry of Commerce & Industry, Government of India and other leather industry stakeholders visited CSIR-CLRI Pavilion at IILF.

Shri E Srinivas, Joint Secretary, DPIIT, Ms Sabiha Rizvi, Director, Leather Section, DPIIT and Shri R Selvam IAS, ED CLE, also visited CSIR-CLRI Stall. Dr. K.J Sreeram, Director, CSIR-CLRI, interacted with the delegation explained various research activities, services and technologies of the Institute. This year too, the CSIR-CLRI stall witnessed a high footfall, reflecting strong interest and engagement from industry stakeholders.

CSIR-CLRI remains committed to being your trusted technology platform and education hub, continually driving innovation and excellence in the leather sector.

LERIG Conclave 2025

The 58th Edition of the Leather Research Industry Government (LERIG) Conclave, organised by the CSIR-Central Leather Research Institute (CSIR-CLRI), was held on 2 February 2025 at the Chennai Trade Centre, Chennai. The event brought together key stakeholders from the leather and leather chemical industries and hosted informative technical sessions that offered valuable insights. The event focused on the current trends in the areas of Specialty Chemicals, Sustainability, Cost Reduction and Productivity Improvement.

The inaugural session commenced with a welcome address from Dr K J Sreeram, Director, CSIR-CLRI. He explained the significance of the LERIG Conclave and emphasized the importance of collaboration

between industry and research institutions in driving forward innovative solutions in the leather industry and in the area of speciality chemicals. Shri Rajendra Kumar Jalan, Chairman, Council for Leather Exports (CLE) and CEO, M/s AFPL Global Pvt. Ltd., in his presidential address provided insights into the global market dynamics affecting the leather sector. He highlighted the challenges, and opportunities for the sustenance of the leather sector, emphasizing sustainable processes, water recycling, circular

economy, lean manufacturing, carbon neutrality goals, and innovative solutions. In driving these initiatives, the role of CSIR-CLRI's is very crucial. He encouraged the industry to focus on design and skill development with the support of CSIR-CLRI.

During the event, a Technology Compendium of CSIR-CLRI was released by Shri Rajendra Kumar Jalan, and the first copy was received by Shri M Abdul Wahab. Shri M Abdul Wahab, Regional Chairman (South), CLE and Managing Director, M/s K.H. Exports India Pvt. Ltd., Shri N Shafeeq Ahmed, President, South Indian Shoe Manufacturers Association (SISMA), and Director, M/s S S C Shoes Pvt. Ltd. and Shri V Noushad, President, Confederation of Indian Footwear Industries (CIFI) and Managing Director, M/s Walkaroo International Pvt. Ltd were Guest of Honour for the event.

Shri M Abdul Wahab shared his insights on the current challenges and opportunities in the leather industry. He conveyed that CSIR-CLRI shall leverage its expertise to focus on key areas such as innovation, academic and training initiatives, pollution control and sustainability, as well as partnerships and collaborations. Shri Shafeeq Ahmed congratulated CSIR-CLRI for coming out with "*Genuine Leather Mark"* and emphasized the importance of free trade in the leather industry. Shri V Noushad highlighted the need for Indian industries to prepare for significant opportunities to align with global market trends and the importance of nurturing start-ups and fostering Industry-Institute collaborations.

In a series of Technology talks, Dr B Madhan, Chief Scientist, CSIR-CLRI spoke on the topic "*Sustainability with a Focus on Carbon Footprint Assessment Software*", He presented the efforts taken by CSIR-CLRI towards integrating sustainability in the leather sector with special emphasis on the software developed for assessing Carbon Footprint in leather and footwear industries.

Dr R Aravindhan, Senior Principal Scientist, CSIR-CLRI spoke on *"Specialty Chemicals from CSIR-CLRI"*, highlighting the institute's research and development efforts in specialty chemicals tailored for the leather industry

The 6th Professor S S Dutta Memorial Lecture was delivered by Dr N Mohan, Director and CEO (Footwear Business), Kothari Industrial Corporation Ltd., on "*Indian leather and footwear Sectors current scenario and way forward*" which was organized by Indian Leather Technologists' Association (ILTA) in association with CSIR-CLRI. Dr N Mohan explained that the Indian leather and footwear sectors are experiencing significant growth, driven by increasing domestic and global demand for sustainable products. He emphasized that the way forward involves embracing innovation, enhancing supply chain efficiency, and prioritizing sustainability to maintain competitiveness.

In an exclusive session on Industry Interaction Stakeholders' Connect on Specialty Chemicals, industry perspectives by eminent stakeholders were presented. The future of Specialty Chemicals in the Leather sector was presented by Dr K J Sreeram, Director, CSIR-CLRI. Dr Kannan Srinivasan, Director, Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI) briefed about CSIR mission on Specialty Chemicals and Dr N Nishad Fathima, Chief Scientist, CSIR-CLRI gave an overview of the project details of CSIR-CLRI on specialty chemicals for upholstery applications.

The industry perspective was delivered by eminent members from the industry - Shri Ramesh Iyengar, Chairman and Managing Director, M/s. Zsivira Chemie Merk Pvt. Ltd., Shri Arun Janakiram, Business Director, M/s. Smit & Zoon India Pvt. Ltd., Shri Subbarayan Govardhanan, General Manager, M/s. ATC Chemicals India Pvt. Ltd., Shri A Jaganathan, Head, Production, M/s. Tata International and Shri Suresh

Balasubramaniam, Chairman and Managing Director, M/s. BAB Group of Companies. The focus was on cost-effective solutions that improve performance to ensure market adaptability, while also maintaining a strong commitment to sustainability. The industry experts emphasized the role of specialty chemicals in enhancing product performance and sustainability. The need for life cycle analysis and low bis-phenol syntans was also discussed. They highlighted the need for continuous innovation and collaboration to harness technological advancements, meet market demands and drive sustainable growth in the leather sector.

The LERIG Conclave 2025 concluded with the Leather Ambassadors Meet, which served as a vital platform for alumni to reconnect, share experiences, and discuss industry advancements. The ALFA Orator awardee, Dr K J Sreeram, Director, CSIR-CLRI delivered a talk on "*R & D led growth model for sustainable development of leather sector*". The Conclave showcased innovations in leather research and specialty chemicals, fostering productive interactions among policymakers, industry

leaders, researchers, and stakeholders, thereby paving the way for innovative solutions and a sustainable future for leather and allied industries. The Conclave witnessed the active participation of more than 350 stakeholders in the leather and allied sector.

INTERNATIONAL MOTHER LANGUAGE DAY

International Mother Language Day 2025 was celebrated at CLRI on 21 Feb 2025. A Technical Seminar was conducted for the staff and scholars of the Institute. The details of participants are as follows:

S.No.	Name of participant	Topic	Language
1	Dr. U Mani Principal Technical Officer	Toxicity Studies in Animal Models	Tamil
2	Dr. B Ravikumar Senior Scientist	Statistics in Research	Tamil
3	Mr. Y. Madhan Teja SRF (CSIR)	Fibrosis Regulation – Modifications, Strategies and Applications through Scaffold Proteins	Telugu
4	Mr. D. Dinesh Kumar JRF (CSIR–UGC)	Development of 3D Supramolecular hydrogels comprising Amino Acid / Peptide based low molecular weight compounds and organic nanoparticles.	Tamil

Science Outreach for Rural Students by CSIR-CLRI

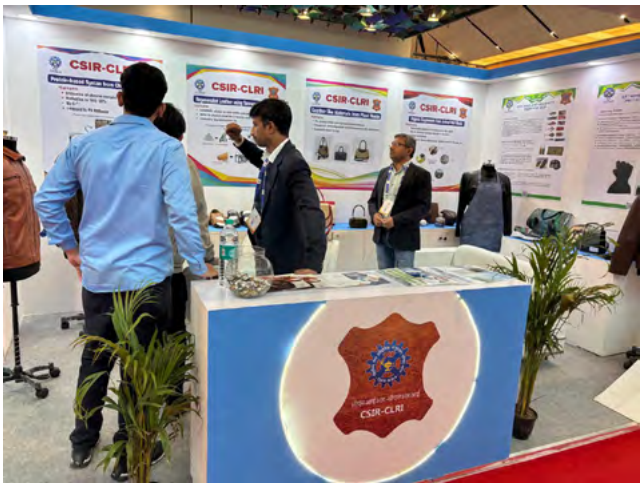
CSIR-CLRI hosted a one-day Science outreach program and a workshop on 26 February 2025, at Corium Hall, Tannery Building, for rural students. College students from the Department of Chemistry at Jawahar Science College, Neyveli (Cuddalore District), and the Department of Biotechnology at Periyar University Centre for PG & Research Studies, Dharmapuri District, Tamil Nadu visited CSIR-CLRI, Chennai. There were about 21 M.Sc. Chemistry students, 40 M.Sc. Biotechnology students and six faculty members. Dr. A. Tamil Selvi, Senior Principal Scientist of the Skill & Training Unit, welcomed the students and provided insights into various research opportunities and funding schemes available for academic and professional growth.

Dr. S.M. Jai Mohan, Senior Scientist, CSIR-CLRI spoke on amyloid plaques, which causes Alzheimer's disease, and how the synthesized molecules inhibit fibrillation. Dr. C. Lajapathi Rai, Sr. Principal Scientist, CSIR-CLRI, elaborated on the valorisation of tannery animal hair waste using greener methods. Students visited various departments to learn about the ongoing research activities. They found the visit highly informative and valuable for their careers.

CSIR-CLRI @ Delhi International Leather Expo (DILEX 2025)

CSIR-CLRI participated in the Delhi International Leather Expo (DILEX 2025) held during 20-21 February, 2025. The event was organized by Council for Leather Exports (CLE), Ministry of Commerce and Industries, Government of India at India International Convention Centre, Yashobhoomi, New Delhi. Various technologies and products developed by CSIR-CLRI were showcased during the event.

Several delegates from Inia and abroad visited the stall and interacted with the CSIR-CLRI staff. Mr. Abhinandan Kumar, Senior Principal Scientist and Mr V Karthik, Principal Scientist represented the institute at the event.



Activities at CLRI Regional Centre, Jalandhar

National Science Day Celebration

Students and Faculty members from NIT Jalandhar visited CLRI Regional Centre, Jalandhar on the occasion of National Science Day. The Scientist In-Charge, Regional Centre Jalandhar, Dr. S V Srinivasan, briefed the mandate of CSIR-CLRI and delivered a lecture on leather, effluent and solid waste management. Shri. V. Karthik, Principal Scientist delivered a lecture on leather processing & products, followed by Dr. P. Sudhakara, Principal Scientist, on the requirements of standard protocols for testing leather and leather products. Dr. Mozhiarasi V, Scientist presented on waste treatment technologies with a special focus on group activity, on waste management plan building. The technical colleagues have demonstrated the facilities, followed by a tannery visit. The feedback from the students was overwhelmingly positive, with many expressing their gratitude for the opportunity to learn from our team. They expressed a strong interest in pursuing internship and other programs with CSIR-CLRI in the near future.

Activities at CLRI Regional Centre, Kolkata

Training program on Industrial Glove Manufacturing

CSIR-CLRI conducted a two-week training program on Industrial Glove Manufacturing for Burnpur Mahila Voluntary Samity women entrepreneurs. This initiative aims to empower women with skills and knowledge to manufacture high-quality industrial gloves, promoting entrepreneurship and economic empowerment.

Invited a talk on 'Research Opportunities in India'

Dr. Tamil Selvi, Senior Principal Scientist, spoke on the topic Research Opportunities in India at the PG and Research Department of Chemistry, Presidency College (Autonomous), Chennai. The talk held on 12 February 2025 was attended by over 99 students and 13 faculty members.

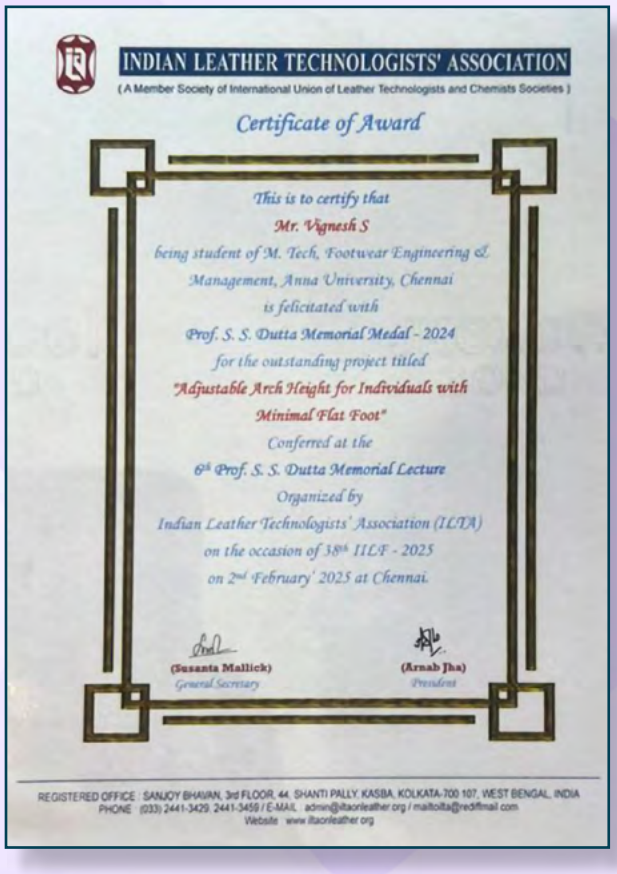
Leadership Development Workshop for Women Scientists

Dr. Yasmin Khambhaty, Principal Scientist, and Dr. Bindia Sahu, Senior Scientist, CSIR-CLRI nominated for the Leadership Development Workshop for Women Scientists Working in Space and Allied Sciences (WiSLP) Program organized by Department of Science and Technology in collaboration with The British Council under the UK-India Education and Research Initiative (UKIERI) at JNCASR, Bengaluru.

Dr. Yasmin Khambhaty, Principal Scientist, CSIR-CLRI received the "*Peoples Choice Award*" for her 3MT thesis presentation on "*Transformational and Mindful Leadership: Synergies for Success*" at the Leadership Development Workshop for Women Scientists Working in Space and Allied Sciences (WiSLP) Program organized by Department of Science and Technology in collaboration with The British Council under the UK-India Education and Research Initiative (UKIERI) at JNCASR, Bengaluru.

Congratulations!

Mr. Vignesh, student of previous batch of M.Tech has been conferred with award of Certificatep for the outstanding project work by ILTA in the recently held event IILF 2025.



INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION

(A Member Society of International Union of Leather Technologists and Chemists Societies)

Certificate of Award

This is to certify that

Mr. Vignesh S

being student of M. Tech, Footwear Engineering & Management, Anna University, Chennai

is felicitated with

Prof. S. S. Dutta Memorial Medal - 2024

for the outstanding project titled

"Adjustable Arch Height for Individuals with Minimal Flat Foot"

Conferred at the

6th Prof. S. S. Dutta Memorial Lecture

Organized by

Indian Leather Technologists' Association (ILTA)

on the occasion of 38th IILF - 2025

on 2nd February' 2025 at Chennai.

(Susanta Mallick) General Secretary

(Arnab Jha) President

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Mrs. B Kanimozhi, Senior Technical Officer, PPME Department, participated in Q-Quest 2025, annual conference organized by AU TVS Centre for Quality Management, Anna University on 5 February 2025 and won first prize in the Poster and Caption Competition and Silver Award in the 5 'S' Competition.

Editor-in-Chief: **Dr KJ Sreeram, Director, CSIR-CLRI**
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Visit: **https://clri.org** for the digital version of **The LEATHER POST**
For Feedback and Comments: Editor, The Leather Post; email: chandrag@clri.res.in

Congratulations!

Dr. U. Sathya, Scientist, CSIR-CLRI participated in the Women's Cricket Tournament in 52 SSMBT finals (outdoor) held at CSIR-IHBT, Palampur on10 February 2025 and was awarded "*Player of the Match*" award Her team '*JWALA*' has won the cup.

CSIR-Central Leather Research Institute observed the Safer Internet Day

CSIR-CLRI observed Safer Internet Day on 11 February 2025 spearheaded by the Ministry of Electronics and Information Technology (MeitY). Staff and research scholars of CSIR-CLRI participated in the event and listened to the broadcast at Tagore Ashram, CSIR-CLRI, Chennai. This nationwide awareness campaign was aimed at promoting safe and responsible use of the internet. Organized under the theme 'T*ogether for a Better Internet*', the campaign aimed to educate and sensitize internet users about cyber hygiene, online safety practices, and emerging cyber threats. This initiative was conducted under the Information Security Education and Awareness (ISEA) program in collaboration with various partner institutions.

Visitor from Leibniz University, Hannover, Germany, Dr. Dirk weichgrebe from Leibniz University, Hannover, Germany, Project investigator of Indo-German projects, visited CSIR-CLRI during 20 - 21 February 2025. During the visit he held discussions with researchers on completed project and explored potential area for collaborations, including exchange visits.

About 45 students, along with two faculty members from the Department of Bioinformatics at Saveetha Institute of Medical and Technical Sciences, Saveetha University, Thandalam, Chennai, visited CSIR-CLRI on 14 February 2025. During the visit, the students interacted with researchers in the field of leather science and the application of bioinformatics tools.

CSIR-Central Leather Research Institute

(CSIR Integrated Skill Initiative Training Programme)

CSIR-CLRI announces the commencement of the following placement oriented courses

Leather Processing

- Post Graduate Diploma Programme in Leather Technology
- Diploma in Leather Processing
- Short Term Executive Skill Development Programme in Leather Processing
- Integrated Skill Development on Quality Control Methods in Leather Manufacture
- Computerized colour Matching for Leather manufacturing

Leather and Leather products

- Post Graduate Diploma Programme in Leather Products Technology
- Quality and Visual Inspection of Leather and Leather Products
- Skill Training Programme in Leather and Leather-like materials for Emerging Entrepreneurs
- Short Term Executive Skill Development Programme in Leather Upholstery Manufacture
- Course in Fashion Design and Development for Leather Lifestyle Products

Leather Goods and Garments

- Diploma in Leather Goods Manufacture
- Short Term Executive Skill Development Programme in Leather Goods Manufacture
- Training Programme in Leather Goods Design (Manual and CAD)
- Diploma in Leather Garment Manufacture
- Short Term Executive Skill Development Programme in Leather Garments manufacture
- CAD for Garments

Allied Science courses

- Bioinformatics Associate/ Analyst
- Quality Control Chemist – Microbiology
- QA Chemist Equipment Validation - Life Sciences
- Nuclear Magnetic Resonance (NMR) Spectroscopy Analyst
- Quality Assurance Chemist
- Leather Biotechnologist
- Enzyme Technologist
- Structural Analytical Technologist
- rDNA Technologist

Leather Allied Sectors

- Short Term Executive Training Programme on Occupational Health and Safety for Leather and Allied (Product) Industries
- Short Term Executive Training Programme on Testing and Calibration for Leather Sector
- Repair, restore and maintenance of leather products
- Short Term Executive Training Programme on Waste Management for

Footwear

- Diploma in Footwear Manufacture
- Short Term Executive Skill Development Programme in Footwear manufacture
- Training programme in GAIT Analysis
- CAD for Footwear

Please visit https://clri.org/training.aspx for online / offline submission of duly filled in application

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For more info:

Website : https://clri.org/training.aspx

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Grace Felciya


Dr A Rajaram


Dr A Rajaram


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Striving for Excellence and
Global Leadership in Leather Technology

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