Secretary DPIIT Shri Anurag Jain was briefed about the Indian Footwear Sizing Project.
Dear Stakeholders,

CSIR-CLRI as an R&D organization has been striving to take S&T leads to the industry. This issue presents some of those research that have reached the society or are likely to reach shortly through the main campus and the regional centres. A glance on the events that took place during the month is also provided. Hope you would enjoy reading The Leather Post.

Jai Hind

No | Description |
---|-------------|
1 | Earth Day 2022 |
2 | World Earth Day celebration at CSIR-CLRI Regional Centre, Jalandhar |
3 | Dr B R Ambedkar 131st birthday celebration |
4 | Research in focus Publications |
5 | Indian Footwear Sizing Project – Foot survey at DPIIT |
6 | Swachhata Pakhwada - Essay and Drawing Results |
7 | Activities at Regional Centre, Kanpur |
8 | Invited Lecture |
9 | Visits |
10 | Brainstorming session-"Contemporary Sustainability Challenges and opportunities for the Leather Industry" |
11 | CSIR-CLRI Training programs |
12 | CSIR-CLRI Campus Life |
Earth Day 2022

On the occasion of Earth Day 2022, Plastic Cleaning Drive was held on 22nd April 2022 at CSIR-CLRI. The Staff and Research Scholars of CSIR-CLRI participated in the cleaning drive. The students of Kendriya Vidyalaya, CLRI, Chennai also participated in the cleaning drive to make the campus plastic-free.
World Earth Day celebration at CSIR-CLRI Regional Centre, Jalandhar

CSIR-CLRI Regional Centre, Jalandhar celebrated the Earth Day by planting various saplings in the Campus.

On this occasion compost pits/yards were set up at the Campus. The pit composting in the campus can be used to use garden wastes as a nutrient rich organic fertilizer.

On the occasion of Dr B R Ambedkar 131st birth anniversary, Director and staff of CSIR-CLRI paid tributes to Dr B R Ambedkar on 14 April 2022.
Surface active agents, well known as surfactants, are used in a wide range of applications, such as detergents, paints, enhanced oil recovery processes, cosmetics, pharmaceuticals, food processing, material synthesis.

Surfactants have a head part which is a polar hydrophilic functional group, connected to a tail which is hydrophobic nonpolar. Above a particular concentration, known as critical micelle concentration (CMC), surfactants self-aggregate in water to form a micelle. The CMC values of surfactants depend upon tail length, chain structure, nature, and valance of counter ions, temperature, medium, and the presence of additives.

Hydrotrope, a special class of small amphiphilic organic compounds, has the ability to increase the solubility of insoluble lipophiles in water. Hydrotropes have structural similarity to classical surfactants and is well known for more than a century and has numerous industrial applications. They are extensively used in solubilization, separation, extraction processes, pharmaceutical, and cosmetics.

In this study, the interactions of anionic surfactant, sodium dodecyl sulfate (SDS), with anionic hydrotrope, 1,3-Benzenedisulfonic acid disodium salt (BDS) and their micellization behavior in aqueous medium are reported. CMC values of surfactant-hydrotrope decrease with increasing hydrotrope concentration. Interactions between hydrotrope and surfactant are synergistic in nature. The effect of hydrotrope and temperature on different thermophysical properties are evaluated. Experimental techniques like FTIR and NMR were employed to reveal the non-covalent interactions of mixed surfactant-hydrotrope systems.

Sumitha Kanniappan Rajendran, Julfikar Hassan Mondal and Md. Sayem Alam*

A scheme showing the synergistic interactions between SDS surfactant and BDS hydrotrope to form micelle.
Silver which has a gorgeous shine in its metallic state is not only being used in jewellery and cooking utensils but also in ayurvedic medicine (Rajat Bhasma (calcinated form)) from very ancient time. Silver metal complexes have several biological functions including anticancer activity. In this study the researchers report selective anticancer activity of synthetic Ag(I) complex against mouse liver cancer cells. The reactivity of 1 against the cancer cells was found through formation of Reactive Oxygen Species (ROS) induced mitochondrial death.

Cytotoxicity level of sample in normal cell, BRL-3A and cancer cell Hepa1-6 was assessed by MTT Assay. The Ag (I) complex showed cytotoxicity towards cancer cell line at a concentration as low as 2 µM. Morphology of the cancer cells on treatment with compound 1 and X-ray structure of compound 1 are shown as Figures 1 and 2, respectively. Acridine orange/propidium iodide (AO/PI) dual staining is an important fluorescence-based assay for confirming whether the cytotoxicity of samples observed was induced via apoptosis. Anticancer activity of samples at 2 µM and 5 µM concentrations are reproduced as Figure 3. Hepa1-6 cells showed significant cell death via apoptosis at IC_{50} concentration (2 µM). All the cells undergo apoptosis at the concentration 5 µM. Normal cell line BRL-3A showed no apoptosis till 2 µM and at 5 µM. The results indicate the ability of compound 1 to selectively kill the cancer cells at concentrations of 2 µM and 5 µM without harming the normal cells in host system.

The results confirm the ability of Ag(I) complex to selectively inhibit the growth of cancer cells. It alters the mitochondrial membrane potential and elicits ROS response with no adverse effect on normal cells.

Rajarshi Ghosh & Manikantan Syamala Kiran

Fig. 1 X-ray structure of 1

Fig. 2 Microphotographs of Hepa1-6 cell line treated with different concentrations of 1 a) 0.1 µM, b) 0.25 µM, c) 0.5 µM, d) 1.0 µM, e) 1.5, f) 2.0 µM, g) 5.0 µM, h) 10.0 µM

Fig. 3 AO/PI assay results of 1
As part of the Indian footwear sizing system project, foot survey was conducted on 6th April 2022 at Department of Promotion for Industrial and Internal Trade (DPIIT), New Delhi. The Secretary DPIIT Shri Anurag Jain, IAS was briefed about the process of conducting pan India foot survey. A total of 72 measurements were taken at DPIIT. The Secretary, DPIIT interacted with the Team Members and also had his foot scanned.

This pan India survey is executed by CSIR-Central Leather Research Institute (CSIR-CLRI) under the aegis of Department of Promotion for Industrial & Internal Trade (DPIIT) and CLRI lead a pan India foot scanning survey along with synergy partners, data from which will be used to define Indian footwear size standards and which will be included by shoe manufacturers in their size charts.
Swachhata Pakhwada - Essay and Drawing Results

Swachhata Pakhwada, a fortnight-long program, launched for mass participation of citizens in cleanliness activities by the Govt. of India was organised at CSIR – CLRI during March 2022. The objective was to bring a fortnight of intense focus on the issues related to swachhata and to highlight the importance of cleanliness and sustainability.

CSIR-CLRI organised an essay and drawing/painting competition for the students/researchers under the following themes:

- Renewable Energy production
- Concept for Biodiversity protection
- Impact of Greenhouse effect
- Carbon Footprint
- Health and Environment

The programme was coordinated by Dr. K. Sri Bala Kameswari, Senior Principal Scientist, Mr. S. Nithiyanantha Vasagam, Principal Scientist, Dr. T. S. Uma, Principal Scientist Dr. Bindia Sahu, Senior Scientist, and Dr. Thillai Sivakumar N, Scientist. There was overwhelming participation for the programme. Over 580 students registered from across the country and a total of 215 students submitted their entries: 119 for Essay writing and 96 for drawing. On the whole 51 school students, 148 UG/PG students and 16 research scholars participated. Based on the jury’s decision, winners were selected. E-certificates were issued to all the participants.

The paintings of some of the winners
Shri Maneesh Chauhan (IAS), Commissioner and Director Industries, Govt. of Uttar Pradesh visited CLRI-KLC laboratory facility (Banthar) to assess the requirements for optimising the potential of the testing services. Scientist-in-Charge, Kanpur, KLC officials and industry representatives were present during the visit.

A high-level delegation led by Fakhriddin A. Boboev, Chairman of Uzcharmsanoat Association, Uzbekistan visited Kanpur on 13th April, 2022 for business meeting with stakeholders. They also had a meeting with the Scientists from CSIR-CLRI, during which the prospects for development of leather sector in Uzbekistan were discussed. The delegation had sought guidance and support from CSIR-CLRI with its vast experience and expertise for sustainable growth of leather sector in their country through technological intervention and skilling.
Dr. Mozhiarasi V, Scientist, CSIR-CLRI gave an invited lecture on the topic “Solid wastes: An eco-benign Outlook to Future’s Bio-fuel” organized by Institution Innovation Council and Department of Microbiology of Dwaraka Doss Goverdhan Doss Vaishnav College, Chennai. About 50 Postgraduate students attended the session and exhibited profound interest in the topic. The organizing department and students have expressed their appreciation towards CSIR-CLRI for providing insights into research.

The Director and Staff of CSIR-CLRI express their hearty congratulations to Dr. Rajesh S. Gokhale, Secretary, Department of Biotechnology for taking over additional charge of Director General, CSIR-cum-Secretary, Department of Scientific & Industrial Research.

The Director and Staff of CSIR-CLRI wish Dr. Shekhar C. Mande, DG, CSIR a very happy and healthy life on his superannuation.
Students/faculty from BDS of Adhiparasakthi Dental College and Hospital, Melmaruvathur visited CSIR-CLRI on 13th April 2022. The students visited the Department of Microbiology, 3D Printing, Polymer and Animal House facilities at CSIR-CLRI. The students showed great interest and expressed that the fermentation techniques are useful for their project work as it was part of their syllabus. The experts at CSIR-CLRI had briefed the students about the various research projects being carried out at CSIR-CLRI.
Postgraduate Students of V.V.Vanniaperumal College for Women, Virudhunagar visited CSIR-CLRI on 29 April 2022. The students visited the Department of Biochemistry & Biotechnology, Inorganic & Physical Chemistry, Polymer Science & Technology, Advance Materials and Leather Processing. The students showed immense interest and expressed their happiness during their visit. The experts at CSIR-CLRI had briefed the students about the various experiments carried out in the labs.
A brainstorming session was organised at CSIR-CLRI. **Prof. Lawrence Surendra**, Council Member, The Sustainability Platform Asia, Mysore spoke on “Contemporary Sustainability Challenges and opportunities for the Leather Industry”. Scientists and researchers of CSIR-CLRI had an interaction session on the topic.
CSIR-Central Leather Research Institute

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 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

**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 Leather Sector

**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

**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

**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

For more info:
Website: https://clri.org/training.aspx
Chennai: +91 44 24437109 / chord@clri.res.in ; Kolkata: +91 33 23292381 / clrikol@clri.res.in ;
Jalandhar: +91 18 12651306 / clrijal@clri.res.in ;
Kanpur: +91 512 2986936 / clrikrp@clri.res.in ; Ahmedabad: +91 79 25840352 / clriahd@clri.res.in
CSIR-CLRI
World’s Largest Leather Research Body. A Dependable Source for Technologies & Services
Striving for Excellence and Global Leadership in Leather Technology
https://clri.org