# CSIR IN INEDIX



# NEWS BULLETIN 6 TO 10 OCTOBER 2020









### CSIR, KPIT conduct successful trial runs of hydrogen fuel cell prototype car

CSIR-NCL, CECRI

10<sup>th</sup> October, 2020



The Council of Scientific and Industrial Research (CSIR) and KPIT Technologies successfully ran trials of India's first Hydrogen Fuel Cell (HFC) prototype car running on an indigenously developed fuel cell stack, a statement said on Saturday. The HFC technology uses chemical reactions between hydrogen and oxygen (from air) to generate electrical energy, eliminating the use of fossil fuels. Further, the fuel cell technology emits only water, thus cutting down the emission of harmful greenhouse gases along with other air pollutants. The fuel cell is a low-temperature PEM (Proton Exchange Membrane) type that operates at 65-75 degrees Celsius, which is suitable for vehicular applications. The CSIR and the KPIT have developed a 10 kWe

(Kilowatt-electric) automotive grade LT-PEMFC (low-temperature PEM fuel cell) stack based on the CSIR's know-how. "The heart of the PEM fuel cell technology includes the membrane electrode assembly, which is wholly a CSIR know-how. "KPIT brought in their expertise in stack engineering which included light-weight metal bipolar plate and gasket design, development of the balance of plant (BoP), system integration, control software and electric powertrain that enabled running the fuel cell vehicle," read the statement. "The fuel cell stack uses extremely thin metal bipolar plates, thus reducing the stack weight by about two-thirds," it added. In 2016, National Chemical Laboratory (NCL), Pune, and Central Electro Chemical Research Institute (CECRI), Karaikudi – both CSIR labs – as part of the Industry Originated Project (IOP) category of the New Millennium Indian Technology Leadership Initiative (NMITLI) scheme partnered with the KPIT for the development of an automotive grade PEM Fuel Cell technology. "The HFC technology, with further adoption and use, is poised to make the world a



cleaner place with reduced air pollution levels," read the statement. The trials were run on a battery-electric passenger car platform retrofitted with the fuel cell stack. However, it is expected that the technology is more suited for commercial vehicles (CV) such as buses and trucks. Battery electric buses/trucks require a large battery to achieve the desired operating range. In comparison, HFC technology requires a much smaller battery for a very large operating range. Hence, HFC technology offers more promise for the commercial vehicle segment, said the statement. "The FC vehicle is fitted with a Type III commercial hydrogen tank. Its capacity is around 1.75 Kg of H2 stored at about 350 bar pressure and the FC vehicle should run for approximately 250 km range under typical Indian road conditions at moderate speed of 60-65 kmph.

"The entire fuel cell stack and its associated components with the powertrain were retro-fitted in a standard 5-seater sedan car," the statement added. KPIT Chairman Ravi Pandit said the technology had a great future and owing to its indigenous development, was expected to be more commercially viable than ever before. CSIR-NCL Director Ashwini Kumar Nangia said the time had come for renewable energy based on hydrogen as fuel to power transportation in the country. This will reduce the petrol and diesel import bill, while hydrogen is the cleanest fuel with water as the only by-product. PTI

#### Published in:

The Tribune



# हाइड्रोजन ईंधन सेल से वाहन चलाने की दिशा में मिली सफलता, भारतीय वैज्ञानिकों ने प्रोटोटाइप कार पर किया परीक्षण

CSIR

10<sup>th</sup> October, 2020



प्रदूषण और ग्रीन हाउस गैसों के उत्सर्जन को कम करने को लेकर तेज होती मांग के बीच भारत को इस दिशा में एक बड़ी सफलता मिली है। वैज्ञानिक एवं औदयोगिक अनुसंधान परिषद (सीएसआइआर) और कैपीआइटी टेक्नोलॉजी ने हाइड्रोजन ईंधन सेल (एचएफसी) से देश की पहली प्रोटोटाइप कार चलाने का सफल परीक्षण किया है। एचएफसी प्री तरह से देश में ही विकसित ईंधन सेलं स्टैक पर आधारित है। शनिवार को जारी एक बयान में कहा गया है कि एचएफसी तकनीक में विद्युत ऊर्जा पैदा करने के लिए हाइड्रोजन ऑक्सीजन (हवा से) के बीच रासायनिक प्रतिक्रिया कराई जाती है

इसमें पेट्रोल या गैस जैसे पारंपरिक जीवाश्म ईंधनों का इस्तेमाल नहीं किया जाता। ईंधन सेल स्टैक से मतलब विद्युत ऊर्जा पैदा करने वाली बैटरियों से है, जिन्हें एकत्र करने के लिए ज्यादा जगह की जरूरत नहीं पड़ती। इसे सात सीटों वाली कार में आसानी से फिट किया जा सकता है। इस ईंधन सेल तकनीक की सबसे बड़ी खासियत यह है कि यह सिर्फ पानी का उत्सर्जन करती है, इस तरह अन्य वाय् प्रदूषकों के साथ ही हानिकारक ग्रीनहाउस गैसों के उत्सर्जन में भी कटौती करती है। यह तकनीक 65-75 डिग्री सेल्सियस तापमान पर भी काम करती है जो वाहन चलाने के वक्त पैदा होने वाली गर्मी को सह सकती है। बयान में कहा गया है कि सीएसआइआर और केपीआइटी ने 10 किलोवाट की इलेक्ट्रिक बैटरी तैयार की है। एचएफसी तकनीक का इस्तेमाल जैसे-जैसे बढ़ेगा, प्रदूषण का स्तर कम होगा और दुनिया एक साफ-स्थरी जगह बन जाएगी। परीक्षण के लिए बैटरी से चलने वाली इलेक्ट्रिक कार में ही ईंधन सेल को फिट किया गया था। माना जा रहा है कि यह तकनीक बस और ट्रक जैसे बड़े वाहनों के लिए अत्यधिक कारगर साबित होगी, क्योंकि बड़े वाहनों को चलाने के लिए ज्यादा ऊर्जा की जरूरत होती है। एचएफसी तकनीक में



छोटी बैटरी से ही बड़े पैमाने पर विद्युत ऊर्जा का उत्पादन होता है। केपीआइटी के चेयरमैन रिव पंडित ने कहा कि इस प्रौद्योगिकी का बेहतर भविष्य है और इसके स्वदेशी विकास के कारण, पहले से कहीं अधिक व्यावसायिक रूप से व्यवहार्य होने की उम्मीद है। सीएसआइआर-नेशनल केमिकल लैबोरेटरी के निदेशक अश्विनी कुमार नांगिया ने कहा कि अब समय आ गया है कि देश में परिवहन व्यवस्था में ईंधन के रूप में हाइड्रोजन आधारित अक्षय ऊर्जा का प्रयोग किया जाए।

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Dainik Jagran



## CSIR-CMERI Transfers technology of Community level Water Purification system by High Flow Rate Fluoride & Iron Removal

CSIR-CMERI

8<sup>th</sup> October, 2020



The CSIR-CMERI today transferred its High Flow Rate Fluoride & Iron Removal technology to M/s Capricans Aqua Private Limited, Howrah, West Bengal, in Durgapur (WB). The Technology Transfer took place over a Virtual Platform in the presence of Prof. (Dr.) Harish Hirani, Director, CSIR-CMERI, Durgapur. Prof.Hirani, during the event stated, "This Community Level Water Purification System has a Flow-Rate capacity of 10,000 Ltr/hr and uses commonly available raw materials such as sand, gravel and adsorbent materials. It comprises a threestage purification process which purifies water within permissible limits (1.5 ppm & 0.3 ppm for Fluoride and Iron respectively). The technology uses a combination of

Oxidation, Gravitational Settling and Chemisorption process in an Affordable Package. The integrated backwashing profile of the technology will help in improving the shelf-life of the filtration media in a resource rationalised manner" Prof. Hiranisaid that, "As per available statistics the number of Fluoride affected individuals are continuously increasing in a contaminated habitat in the last 50 years. This has been happening in consonance with the disproportional depletion of Water Table, which has led to multiplication of the level of concentration of Fluoride in the particular region. Owing to inaccessibility to Affordable Fluoride Removal Solutions for the drastically affected sections of the Country, the Fluorosis affected statistics has also witnessed an upward trajectory. Besides, the technology is also a major thrust towards the AtmaNirbhar Bharat campaign. Proliferation of this technology will also help in catalysing Employment Generation opportunities for the Youth of the Nation. The strategic deployment of this Community Level system at affected places can help to turn the tide against the menace of Iron and Fluorosis



across the Nation." Shri Sanjay Dutta, Director, Capricans Aqua Private Limited, said that CSIR-CMERI Water Technologies have provided an Affordable and Cost-Effective solution for serving the most vulnerable sections of the Nation. He said, the results generated after deployment of this Water Technologies will be immense. Capricans now intends to deploy the CMERI Water technologies in the Fluoride and Iron affected regions of the states of Jharkhand, Uttar Pradesh and Assam, he added.

#### Published in:

India Education Diary



## Minister calls for brainstorming by scientists for new vision to make change in people's lives

CSIR –IMMT
Science and Technology Minister Harsh Vardhan on Thursday called for brainstorming by scientists for a new vision, rethinking, redesigning and research for making a good change in people"s lives.In his address at a virtual event organised to mark the 57th Foundation Day of the Council for Scientific and Industrial Research"s (CSIR) Institute of Minerals and Materials Technology (IMMT), Vardhan said Indian scientists have always risen to the occasion, whenever the situation demanded. He recalled the contributions of all scientists in various institutions in coming up with innovative ideas and products to combat COVID–19 in the country.

"Dr Harsh Vardhan called for brainstorming by scientists for a new vision, rethinking, redesigning and research for making good change in people"s lives," a statement said. Vardhan extended his greetings to the CSIR-IMMT and lauded the efforts of its scientists in scientifically harnessing waste materials into wealth. The event was attended by Shekhar Mande, Secretary, Department of Scientific and Industrial Research (DSIR) and DG, CSIR, Prof. S Basu, Director, CSIR-IMMT, and several other scientists. Mande highlighted the CSIR-IMMT"s contributions towards alleviating people"s problems during super-cyclone Amphan earlier this year with its various technologies, especially in water purification.

He pointed out that the IMMT has established an NABL-accredited centre of excellence for chemical and biological testing of drinking and industrial water sources, adding that the IMMT"s water-filtration media, popularly known as "Terafil", provides a very low-cost solution to water-treatment technology. Mande drew attention to the institution"s role in fighting the COVID-19 pandemic by developing hospital assistive devices and personal protective equipment (PPE) kits, which include hands-free hand wash and hand sanitisation equipment, liquid hand sanitiser and an antiviral spray machine.



The technologies for these products have been licensed to various medium, small and micro enterprises (MSMEs). Mande said the IMMT is leading a multi-laboratory, farm-based science and technology intervention programme for socio-economic development in the aspirational district of Navarangpur in Odisha under the Rashtriya Krishi Vikas Yojana (RKVY). The institute has started the DSIR-funded Common Research and Technology Development Hub (CRTDH) in the area of new materials and chemical processes. Under this, the IMMT aims to impart training to MSMEs and start-ups in the relevant areas for research and business.

The institute also undertakes programmes to monitor and assess coastal environment and atmospheric pollution round the year. It is collaborating with the Indian Space Research Organisation (ISRO) in this respect. A premier national laboratory of the CSIR, the IMMT is dedicated to harnessing the potential of minerals, materials and other natural resources of the country.

Established in 1964 as the Regional Research Laboratory (RRL) Bhubaneswar, it was renamed as the Institute of Minerals and Materials Technology on April 13, 2007 with a renewed mandate, vision and focus. PTI PR RC

#### Published in:

Outlook



### Tata Steel to Collaborate with CSIR to Deploy Decarbonization Technologies

CSIR-NEERI

8<sup>th</sup> October, 2020



move is expected to cut down on carbon emissions and expedite the transition

toward a decarbonized economy. According to the press statement, both parties would collaborate and work together in key areas like CO2 capture, utilization, and storage. Rakesh Kumar, Director of National Environmental Engineering Research Institute (NEERI), and Debashish Bhattacharjee, VP of Technology and New Materials at Tata Steel, will lead the Tata Steel Limited and the Council of collaborative effort. The council is also Scientific and Industrial Research (CSIR) planning to set up a national facility on CCUS have joined hands to work toward carbon at NEERI Nagpur that would provide a capture, utilization, and storage (CCUS) to platform for interested stakeholders to combat climate change and global warming. participate in fostering the growth of such CCUS is the process of capturing waste measures through a partnership model. carbon dioxide from large point sources, Speaking on the collaborative effort, TV such as a factory, transporting it to a Narendran, MD, Tata Steel, said, "For the storage site, and depositing it where it will sustainability of the steel industry globally and not enter the atmosphere like an particularly in a growing country like India, it underground geological formation. As part is essential that we find an economical solution of the memorandum of understanding for capturing and use or sequestration of CO2 (MoU) signed between the two parties, they at scale. Between CSIR and Tata Steel, we have will work together to deploy CCUS enormous intellectual and research strength technologies in the steel industry. The together with application opportunities. The Tata Steel-CSIR collaboration platform will provide the necessary impetus and also enable



other organizations to join and collaboratively work towards a solution for carbon capture, utilization & storage." The steel giant has been working on several initiatives to harness renewable energy, and it has also been working on waste heat recovery technology. The company has already established a pilot CCU project at its Jamshedpur facility and its ferrochrome facility. Recently, the government of India's Department of Science and Technology invited proposals from Indian researchers in the area of carbon capture, utilization & storage under the Accelerating CCUS Technologies (ACT) program in collaboration with other ACT member countries. ACT is seeking innovative projects that range from smaller research projects to new or already existing pilots and demonstration sites.

Earlier, the National Institute of Transforming India Aayog and the International Transport Forum of Organization for Economic Co-operation and Development had jointly <u>launched</u> a project aimed at decarbonizing India's transport sector.

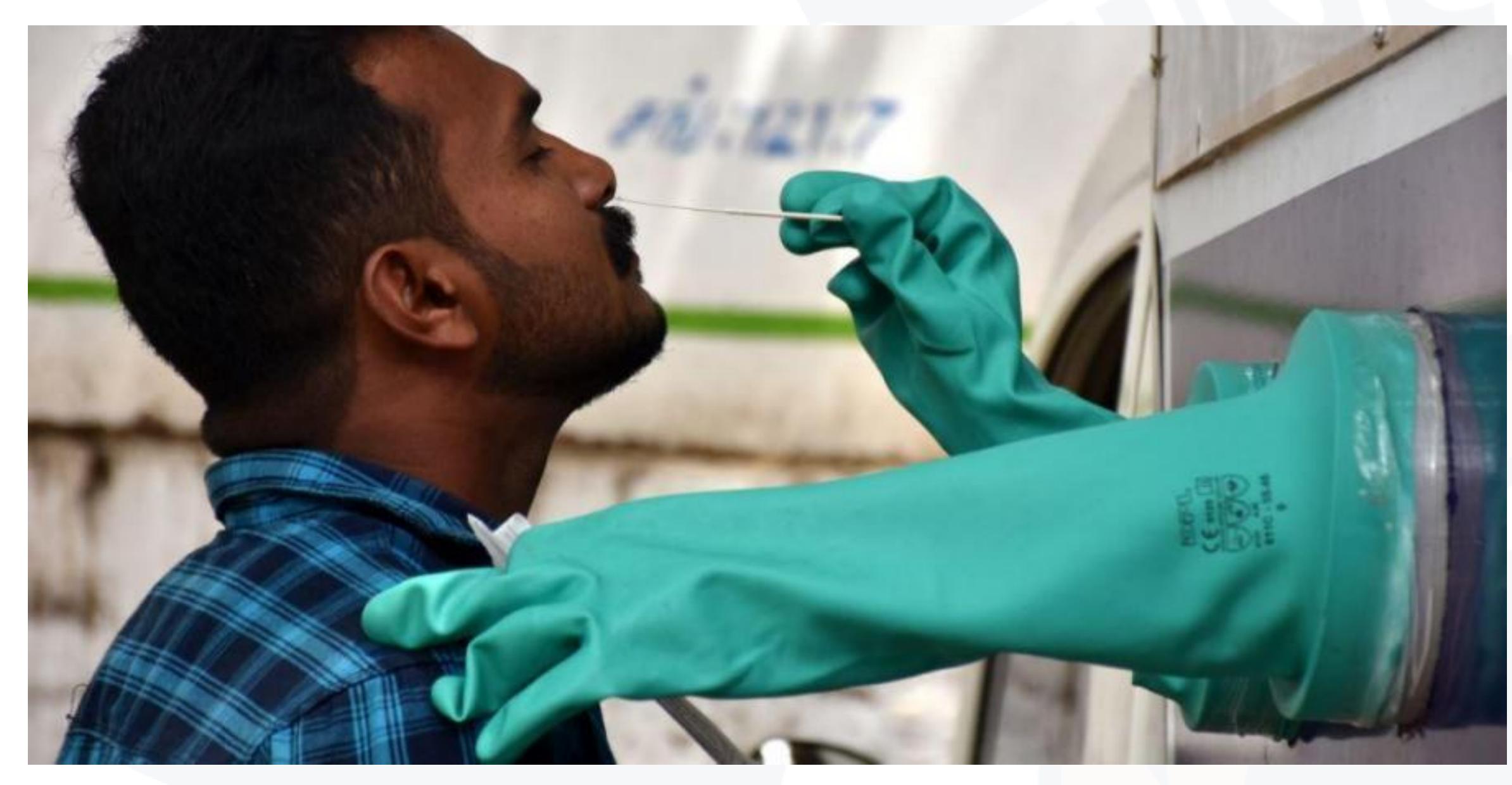
#### Published in:

Mercom India



### COVID: Second infection can be worse than first for some, shows study

#### CSIR-IGIB



developed severe Covid-19 requiring hospitalisation, weeks after being recovered from the disease with mild symptoms, has been documented in India. The findings of the study have dashed expectations that the second infection with coronavirus should be repeat infections have been found to be worse than the first episodes, despite the

8<sup>th</sup> October, 2020 presence of neutralising antibodies. The researchers associated with Kasturba Hospital for Infectious Disease and P D Hinduja Hospital in Mumbai, apart from the two scientific institutions found that for all four HCWs, the second episode was accompanied by worse symptoms, constitutional manifestations, and illness that lasted longer than the first A case of four healthcare workers having episode. Also, all required hospitalisation and treatment with one patient undergoing plasma therapy while another was unable to return to routine activities and work for three weeks, said the study which is under peer-review for publication in The Lancet. All of these patients had the first infection in May and June but they milder. The study was conducted by again developed symptoms in July. The researchers associated with two hospitals in researchers established the presence of the Mumbai, International Centre for Genetic virus in the two episodes of infection through Engineering and Biotechnology and CSIR- the detailed genome sequencing "While the Institute of Genomics and Integrative evidence of people developing severe episodes Biology in Delhi. So far, while it has almost of re-infection is rare, our work has clearly been established that re-infection with manifested that doctors and people need to be SARS CoV 2 in people is possible, there very careful even after they recover from the have been very few instances where the disease once," said Dr. Anurag Agarwal, a scientist with the CSIR-IGIB who is a coauthor of the study.



He added that there were three key takeaways from the study- that immunity is not guaranteed despite infection, protection against the virus may be short-lived and bad disease the next time, though rare, is a possibility. In the paper, the authors have noted that while none of the HCWs developed lower respiratory tract manifestations or breathlessness, this may be explained by their young age. "Older HCWs may experience more severe respiratory involvement," they said, adding that as for those who recover from mild Covid-19 have short term immunity, reinfections may become more common in the future. Incidentally, the paper has come out weeks after two cases of reinfection were reported in the country—both of which were found without any symptoms in the later episodes. Some independent scientists meanwhile raised concerns saying that since the only laboratory evidence of the first infection in such cases has been a single pharyngeal PCR swab, it could also be a case of contamination rather than an actual case of infection the first time.

"As per my knowledge, reinfections are very few to be true possibilities," said a senior immunologist who did not want to be named. "This can be clearly resolved if the researchers have DNA samples from the first swab which can then be used to ascertain the patient's identity," he said.

#### Published in:

The Indian Express



### CLRI team develops tanning agent sans toxic formaldehyde

CSIR -CLRI

6<sup>th</sup> October, 2020

A team of researchers from the CSIR-Central Leather Research Institute has developed a synthetic tanning agent without the toxic formaldehyde traditionally used to enhance leather quality. Formaldehyde, which is used to crosslink or bond two chemical compounds, leaves a residue on the leather. Long-term exposure to this colourless gas, which is also used as a preservative in seafood but banned in many countries, could be harmful to humans while its discharge is toxic to aquatic life.

A team led by K J Sreeram, director, CSIR-CLRI, and chief scientist J Raghava Rao has developed a chromium-melamine synthetic tanning agent, free of formaldehyde, for use after the primary tanning process to enhance leather quality. "We have used a combination of chromium, which gives strength, colour and thermal stability to the leather, with melamine to make the synthetic tanning agent. We have replaced formaldehyde with a patented eco-benign material," said Rao. "Our technology not only improves the leather quality but is also environmentally safe," he added.

After the primary chrome tanning process to convert hides and skins into leather, the leather undergoes a re-tanning process to make its surface smooth, fill the pores and tighten the material. For this, scientists said, traditionally phenol-formaldehyde resins or melamine formaldehyde are used. While phenol is an expensive petroleum byproduct, there was a challenge to find an alternative to formaldehyde, whose release and presence were banned.

"When you procure leather from different sources, the tanning technology usually varies. Rechroming is done to bring a uniformity in the leather quality. Usually chromium and melamine are usually used separately in the process. Our new synthetic tanning agent has a combination of both," Rao said.



Scientists said besides meeting the current environmental stipulations, the newly developed agent also enhances leather by tightening the hide, leaving a fine grain effect, and good buffability with natural sheen. The technology, which won CSIR Technology Award 2020, has been transferred to industry for commercial production.

#### Published in:

The Times of India



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