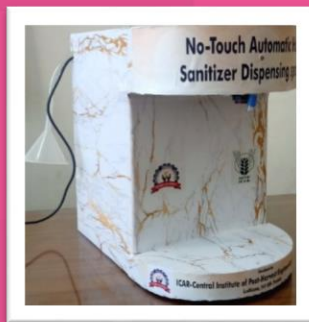


# Technology Information Booklet

July, 2020



## Enduring Technologies developed by ICAR-CIPHET during COVID-19 Pandemic

by

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Dr. R. K. Singh, Dr. Ranjeet Singh, Dr. K. Narsaiah, Er. Yogesh Kalnar, Dr. B. M. Ghodki, Dr. Rahul Anurag, Ms. Surya Tushir

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**ICAR-Central Institute of Post-Harvest  
Engineering and Technology, Ludhiana-141004**

**(An ISO 9001-2015 certified Institution)**



# ICAR-CIPHET OZO-C

## Information Booklet On Enduring technologies developed by ICAR-CIPHET During COVID-19 Pandemic

### ABOUT CIPHET

The ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET) was established on 3rd October 1989 at the PAU Campus, Ludhiana, Punjab, India as a nodal institute to undertake lead researches in the area of the Post-Harvest Engineering and Technology appropriate to agricultural production catchment and agro-industries.

The institute's second campus was established on 19 March 1993 at Abohar, Punjab, India. Which is primarily responsible for conducting research and development activities on fruits and vegetables, and commercial horticultural crops. ICAR-CIPHET is also headquarters for two All India Coordinated Research Projects (AICRPs) viz. AICRP on Post-Harvest Engineering and Technology (PHET) at 31 Centres and AICRP on Plasticulture Engineering & Technology (PET) at 14 Centre's.

### Mandate

- . Research on post-harvest processing, preservation, storage and value addition of agricultural commodities.
- . Human resource and entrepreneurship development in post-harvest engineering and technology.

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## Disclaimer

This information booklet is meant exclusively for the general masses including entrepreneurs, farmers, rural youth, women, industry and governmental organization. The details are provided for the technology that may enable the reader to understand the principle of operation of the smart and compact device. All the developed technologies developed have been described in detail. The figures and tables explain the hardware and software components. It ensures the owner of this booklet to understand the developed technology without any much assistance. It is understood that the views expressed on various topics are the prerogative and responsibility of the concerned authors. Reasonable efforts have been made to accurately provide technical and reliable information, but the authors cannot assume responsibility for any errors and corrections may be brought to the notice of Institute Technology Management Unit, ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana, Punjab (India). Neither the Institute, nor anyone else associated with this technology, shall be liable for any loss, damage or liability directly or indirectly caused or alleged to be caused by misuse of the information given in the booklet.

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## Editors

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## Technology # 1

### Ozone based Fruits and Vegetable Washer-Cum-Purifier (Ozo-C)

**Research Team:** Dr. Ranjeet Singh, Dr. K. Narsaiah, Ms. Surya Tushir

#### Technology detail:

During the Covid-19 pandemic as people bring home fruits, vegetable, mutton, and fish. The fear of contracting corona virus from the same also looms large. To ensure food safety, when we buy such commodities from the vendors and bring home is cause of concern, a suitable gadget with standard protocol is urgently required to ensure complete safety of commodities at home. Thus, such a handy, smart and efficient system is needed to disinfect edible items, in reducing the risk of infection among people. Unlike chemical disinfectant Ozo-C does not leave a residue.

This portable system is an excellent ozonator which removes pesticides, bacteria, viruses and harmful chemical from the surface of fruits and vegetable, sea foods and meat making them hygiene.

The system works on principle of silent “corona discharge method”. It uses electric discharge to produce ozone by splitting the normal oxygen molecules in the air into single atoms. These atoms recombine with air (i.e  $O_2$ ) to form ozone ( $O_3$ ).

The developed system is portable and cost-effective which can be installed in and easy to use in every kitchen, hotels, small-scale fruit vegetable processors and vendors where it can play a vital role in reducing the risk of infection especially during this pandemic period.



**Fig. 1: Portable Ozone Fruits and Vegetable Washer-Cum-Purifier (Ozo-C)**



**Fig. 2: Launching and demonstration of Portable Ozone Fruits and Vegetable Washer-Cum-Purifier (Ozo-C)**

### **Features and usage of Ozo-C**

1. This Ozone based device comprises of PVC box, air blower, ozone generator, ozone air distribution system, timer and on-off switch. The operation of developed device is very simple and user friendly.
2. Take a container and put the fruits and vegetables in it.
3. Fill the container till water level is above fruits and vegetable to be cleaned. Dip the silicon tube with air stone into the container.
4. Set the time of operation (15 -30 min based on commodity) and switch on the power supply.
5. The device will automatically stop after expiry of set time. Remove the stone and throw the treated water.
6. Finally clean and rinse the fruits and vegetables with fresh running water.
7. The cleaned fruits/vegetables are now ready to use for consumption. We can also store the item for later use.
8. The device is compact in design, requiring a small space of 28 cm length, 24 cm width and 10 cm height and weigh only 1.8 Kg.
9. Its ozone output is 100-200 mg/h and its output air pressure is 0.2 kg/cm<sup>2</sup>.
10. The device operates on a 220 V-240 AC single phase power supply.

The Ozone technology based Ozo-C is the need of the hour as fruits and vegetable safety and quality have become more important now in the wake of the COVID-19 pandemic. The compact device is useful and can play a vital role in every kitchen, hotels, small scale fruits and vegetables processors and vendors to reduce the risk of infection, especially, during the pandemic period.

**Licensing details:**

S. No	Title	Contracting party	Licensing fee (Rs.)	Date of licensing
1	Ozone based Fruits and Vegetable Washer-Cum-Purifier (Ozo-C)	Mrs. Snehal Dudhe Proprietor, M/s CRD Invotech, 38, Darda Nagar, Yavatmal - 445001, Maharashtra	23,600	02.06.2020
		A. Sirisha Proprietor, M/s Siri Labs, Ongole, Andhra Pradesh.	23,600	02.06.2020
		Mr. Ikram Haider, 520 B Mutthiganj, Allahabad, Uttar Pradesh	23,600	30.06.2020

**Technology Licensee fee @ Rs. 20, 000/+GST (18%)**

ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana has licensed the recently developed Ozone based fruits and vegetable washer-cum-purifier (Ozo-C) to two three firms namely Mrs. Snehal Dudhe, Proprietor M/s CRD Invotech, Yavatmal (Maharashtra) and Mrs. A. Sirisha, Proprietor M/s Siri Labs, Ongole (Andhra Pradesh) on 02/06/2020 whereas Mr. Ikram Haider, 520 B Mutthiganj, Allahabad, Uttar Pradesh took license on 30.06.2020.



**Fig. 3: Licensing of technology OZO-C on 03/06/2020 through digital mode**



**Fig. 4: Licensing of technology OZO-C on 30/06/2020 through digital mode**



**Fig. 5: Certificate of Licensing to M/s CRD Invotech, (Maharashtra) on 02.06.2020**





**Fig. 6: Certificate of Licensing to M/s Siri Labs (Andhra Pradesh) on 02.06.2020**



**Fig. 7: Certificate of Licensing to Mr. Ikram Hyder (UP) on 30.06.2020**

## Website Coverage (e News):

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2. [https://www.ciphet.in/cadmin/upload/userfiles/file/Ozo-C%20News\(1\).pdf](https://www.ciphet.in/cadmin/upload/userfiles/file/Ozo-C%20News(1).pdf)
3. <https://timesofindia.indiatimes.com/city/ludhiana/icar-ciphet-grants-license-to-2-women-entrepreneurs/articleshow/76185411.cms>
4. <https://krishi.icar.gov.in/jspui/handle/123456789/36469>
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7. <https://muckrack.com/mohitbehltoi/articles>.
8. <https://timesofindia.indiatimes.com/city/ludhiana/ludhiana-develops-low-cost-portable-ozone-based-fruits-and-vegetable-washer-cum-purifier/articleshow/75899767.cms>.
9. [https://realtime.rediff.com/news/india/ICARCIPHET-grants-license-to-two-women-entrepreneurs/1494d3504de5e5c1?src=interim\\_alsoreadimage](https://realtime.rediff.com/news/india/ICARCIPHET-grants-license-to-two-women-entrepreneurs/1494d3504de5e5c1?src=interim_alsoreadimage).
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11. <https://www.cityairnews.com/content/icar-ciphet-granted-license-of-two-technology-ozo-c-and-uvic-to-budding-women-entrepreneurs>.
12. <https://www.cityairnews.com/content/icar-ciphet-ludhiana-develops-low-cost-portable-ozone-based-fruits-and-vegetable-washer-cum-purifier>
13. <https://twitter.com/icarindia>. ICAR-CIPHET develops Low-Cost Portable Ozone based Ozo-C.
14. <http://epaper.punjabkesari.in/punjab/2020-05-28/ludhiana-kesari#pages/6>
15. <https://www.facebook.com/InAgrisearch/ICAR-CIPHET-develops-Low-Cost-Portable-Ozone-based-Ozo-C>.
16. <https://www.bhaskar.com/local/punjab/ludhiana/news/cefet-makes-ozone-based-machine-to-make-vegetables-and-fruits-germ-free-127344399.html>

## News Channel Coverage

S. No.	Name of the channel	Date of telecast	Icon
1	PTC News Punjabi	29/05/2020 at 8:17 PM	
2	News 18 Punjab	30/05/2020 at 9:11 PM	
3	NDTV India	29/05/2020 at 10:40 AM	
4	ETV Punjabi	29/05/2020 at 10:20 AM	
5	India TV news	30/05/2020 at 11:30 AM	
6	Jagbani TV Punjab	29/05/2020 at 11:15 PM	
7	Zee Punjabi	29/05/2020 at 9:27 PM	
8	ETC Punjabi	01/06/2020 at 9:25 PM	
9	INDIA news Punjabi	01/06/2020 at 9:05 PM	
10	AONE Punjabi	02/06/2020 at 8:25 PM	

Print media coverage:

### Ludhiana Keshri: May 28, 2020

## फलों व सब्जियों को कीटाणु मुक्त करने हेतु वैज्ञानिकों ने बनाया ओजोन सिस्टम



**पोर्टेबल सिस्टम के साथ सीफेट के वैज्ञानिकों की टीम।**

लुधियाना, 27 मई (संजुजा): कोरोना महामारी के दौरान बाजार से खरीद कर घर लेकर आये फलों व सब्जियों का कैसे बरतने इन्तेमाल को लेकर बहुत से लोग आज तक दुर्बिधा में पड़े हुए हैं। कई लोग तो फल-सब्जियों के लिए बाजार जाने पर ही नकारात्मकता से बचने के लिए फलों व सब्जियों को कीटाणु मुक्त करने हेतु घाते हैं। कुछ लोग तो इन खाने वाले उत्पादों को अपने घर के पीछे गेट पर खने स्थान पर कुछ समय के लिए रखने के बाद इसका इन्तेमाल करते हैं। इसी बीच फलों व सब्जियों को बैक्टीरिया, खतरनाक कैमिकल व वायरस मुक्त करने हेतु सेंट्रल इंस्टीट्यूट ऑफ पोस्ट हार्वेस्ट इंजीनियरिंग एंड टेक्नोलॉजी (सीफेट) के वैज्ञानिकों ने ओजोन नामक एक नया पोर्टेबल सिस्टम विकसित किया है।

सीफेट के वैज्ञानिक डा. रणजीत सिंह ने बताया कि इस टेक्नोलॉजी का इन्तेमाल घरों, होटलों, छोटे प्रोसेसिंग यूनिटों में आसानी से करके फलों, सब्जियों, मीठ आदि उत्पादों को कुछ मिनटों में कीटाणु मुक्त किया जा सकता है जोकि मौजूदा समय में बहुत फायदेमंद साबित हो सकता है। उन्होंने बताया कि इस टेक्नोलॉजी को निदेशक सीफेट डा. आर.के. सिंह की अग्रणीय में डा. के. नरसिंहा और मिस सूर्या ने तैयार किया है। उन्होंने बताया कि इस पोर्टेबल सिस्टम के इन्तेमाल करने से हानिकारक बैक्टीरिया, खतरनाक कैमिकल व वायरस का डर नहीं रहेगा।

### Ludhiana Tribune: May 22, 2020

## CIPHET develops low-cost washer-cum-purifier

Device to ensure food safety after buying commodities from vendors in the market



**COMPACT DESIGN**  
The device is compact in design, requiring a small space of 28 cm length, 24 cm width and 10 cm height and weighs only 1.5 kg. Its ozone output is 100-200 mg/h and its output air pressure is 0.2 kg/cm<sup>2</sup>. The device operates on a 220V 240 AC single phase power supply.

**KNOW THE SYSTEM**  
The grammer works on the principle of silent 'Ozone discharge method'. It uses electric discharge to produce ozone by splitting normal oxygen molecules in the air into single atoms. The device was made with a unit cost of Rs. 3,500 and has been demonstrated at ICAR-CIPHET.

**User-friendly device, say scientists**  
The system works on principle of silent "Ozone discharge method". It uses electric discharge to produce ozone by splitting the normal oxygen molecules in the air into single atoms. These atoms recombine with air (i.e. O<sub>2</sub>) to form ozone (O<sub>3</sub>). The device was made with a unit cost of Rs 3500 and it has been successfully demonstrated at ICAR-CIPHET, Ludhiana, for use.

**Explaining its step-wise working**  
The scientists said: "Take a container and put the fruits and vegetables in it. Fill the container till water level is above fruits and vegetable to be cleaned. Dip the silicon tube with air stone into the container. Set the time of operation (15-30 minutes based on commodity) and stretch on the power supply. The device will automatically stop after expiry of set time. Remove the stone and throw the treated water."  
Initially, clean and rinse the fruits and vegetables with fresh running water.

### e-Times of India, Ludhiana: May 22, 2020

## Ludhiana develops low cost portable ozone based fruits and vegetable washer-cum-purifier

**THE TIMES OF INDIA**  
New | May 22, 2020, 05:05 PM IST

LUDHIANA: In another invention to its name the Indian Council of Agricultural Research (ICAR) - Central Institute of Post Harvest Engineering & Technology (CIPHET) has developed a low cost ozone based fruits and vegetable washer-cum-purifier (Ozo-C). This device removes pesticides, bacteria, viruses and harmful chemical from the surface of fruits and vegetable, sea foods and meat making them hygienic.

Giving more information about the development, Dr RK Singh, director, ICAR-CIPHET, Ludhiana said, "During the Covid-19 pandemic as people bring home fruits, vegetable, mutton and fish, the fear of contracting corona virus from the same also looms large. To ensure food safety, when people buy from the vendors and bring home a suitable gadget with standard protocol is urgently required to ensure complete safety of commodities at home.

Keeping in view the present grim situation, we have addressed the issue and developed a portable fruits and vegetable washer-cum-purifier named Ozo-C based on ozone technology. This is an excellent consumer which removes pesticides, bacteria, viruses and harmful chemical from the surface of fruits and vegetable, sea foods and meat making them hygienic. The system works on principle of silent "coronavirus discharge method". It uses electric discharge to produce ozone by splitting the normal oxygen molecules in the air into single atoms. These atoms recombine with air (i.e. O<sub>2</sub>) to form ozone (O<sub>3</sub>). The device

Ludhiana develops the low cost portable ozone based fruits and vegetable washer-cum-purifier. Times of India

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### Jagbani Punjabi, Ludhiana: May 27, 2020

## दराने से सब्जियों को नुंबी कीटाणु मुक्त करने लगी विज्ञानियों ने बनाया ओजोन सिस्टम

लुधियाना, 27 मई (संजुजा)- कोरोना महामारी के दौरान बाजार से खरीद कर घर लेकर आये फलों व सब्जियों का कैसे बरतने इन्तेमाल को लेकर बहुत से लोग आज तक दुर्बिधा में पड़े हुए हैं। कई लोग तो फल-सब्जियों के लिए बाजार जाने पर ही नकारात्मकता से बचने के लिए फलों व सब्जियों को कीटाणु मुक्त करने हेतु घाते हैं। कुछ लोग तो इन खाने वाले उत्पादों को अपने घर के पीछे गेट पर खने स्थान पर कुछ समय के लिए रखने के बाद इसका इन्तेमाल करते हैं। इसी बीच फलों व सब्जियों को बैक्टीरिया, खतरनाक कैमिकल व वायरस मुक्त करने हेतु सेंट्रल इंस्टीट्यूट ऑफ पोस्ट हार्वेस्ट इंजीनियरिंग एंड टेक्नोलॉजी (सीफेट) के वैज्ञानिकों ने ओजोन नामक एक नया पोर्टेबल सिस्टम विकसित किया है।

सीफेट के वैज्ञानिक डा. रणजीत सिंह ने बताया कि इस टेक्नोलॉजी का इन्तेमाल घरों, होटलों, छोटे प्रोसेसिंग यूनिटों में आसानी से करके फलों, सब्जियों, मीठ आदि उत्पादों को कुछ मिनटों में कीटाणु मुक्त किया जा सकता है जोकि मौजूदा समय में बहुत फायदेमंद साबित हो सकता है। उन्होंने बताया कि इस टेक्नोलॉजी को निदेशक सीफेट डा. आर.के. सिंह की अग्रणीय में डा. के. नरसिंहा और मिस सूर्या ने तैयार किया है। उन्होंने बताया कि इस पोर्टेबल सिस्टम के इन्तेमाल करने से हानिकारक बैक्टीरिया, खतरनाक कैमिकल व वायरस का डर नहीं रहेगा।

### Times of India: June 6, 2020

## ICAR-CIPHET grants license to two women entrepreneurs

**THE TIMES OF INDIA**  
New | Jun 4, 2020, 04:50 AM IST

LUDHIANA: ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana has licensed the recently developed Ozone based fruits and vegetable washer-cum-purifier (Ozo-C) and portable smart UV-C disinfection system (UVIC) to two firms, both run by women entrepreneurs.

Snehal Dache owns CRD Innotech in Yavatnoli (Maharashtra) got the license for both the technology. A Srisha, proprietor of Sri Labs in Ongole (Andhra Pradesh), got the license for Ozo-C.

Both the entrepreneurs have got the certificate and license of these technologies through digital means due to ongoing nationwide lockdown. The women entrepreneurs expressed their confidence in capturing the market.

Dr R K Singh, director of ICAR-CIPHET, lead the team of innovating scientists and facilitated the event along with Dr. K Narsaiiah, Dr Ranjeet Singh, Surya, Er Yogesh Kalnar, and D. Bhupendra M Ghochi. The research team assured further technical help for mass production of the technology.

### Punjab Keshri, Ludhiana: June 3, 2020

## 2 उद्यमी महिलाओं ने सीफेट से प्राप्त की ओजोन टैक्नोलॉजी

लुधियाना, 3 जून (संजुजा): सेंट्रल इंस्टीट्यूट ऑफ पोस्ट हार्वेस्टिंग इंजीनियरिंग एंड टेक्नोलॉजी (सीफेट) से 2 उद्यमी महिलाओं ने ओजोन टैक्नोलॉजी प्राप्त की है। यह एक टैक्नोलॉजी है, जिससे आप फल, सब्जियों व मीठ आदि उत्पादों को कीटाणु मुक्त करने हेतु घाते हैं।

सीफेट के डायरेक्टर आर.के. सिंह ने बताया कि ये इस टैक्नोलॉजी को आगे बढ़ाने के लिए प्रेरणा की है। उन्होंने कहा कि इस टैक्नोलॉजी को आगे बढ़ाने के लिए प्रेरणा की है। उन्होंने कहा कि इस टैक्नोलॉजी को आगे बढ़ाने के लिए प्रेरणा की है।



ICAR-Twitter page



ICAR-Facebook page



Fig. 8: Twitter and Facebook page of ICAR

## Technology # 2

### **Name of the Technology: Portable Smart Ultraviolet-C Disinfection System (UViC)**

**Research Team:** Dr. Bhupendra M Ghodki, Er. Yogesh B. Kalnar, Ms. Surya Tushir, Dr. K. Narsaiah & Dr. R.K. Singh

### **Technology detail**

ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana has developed a smart, compact and portable surface disinfection system to help fight against COVID-19 pandemic. The system is named as UViC which is a Portable Smart UV-C Disinfection System that can be used to disinfect personal items and office stationery.

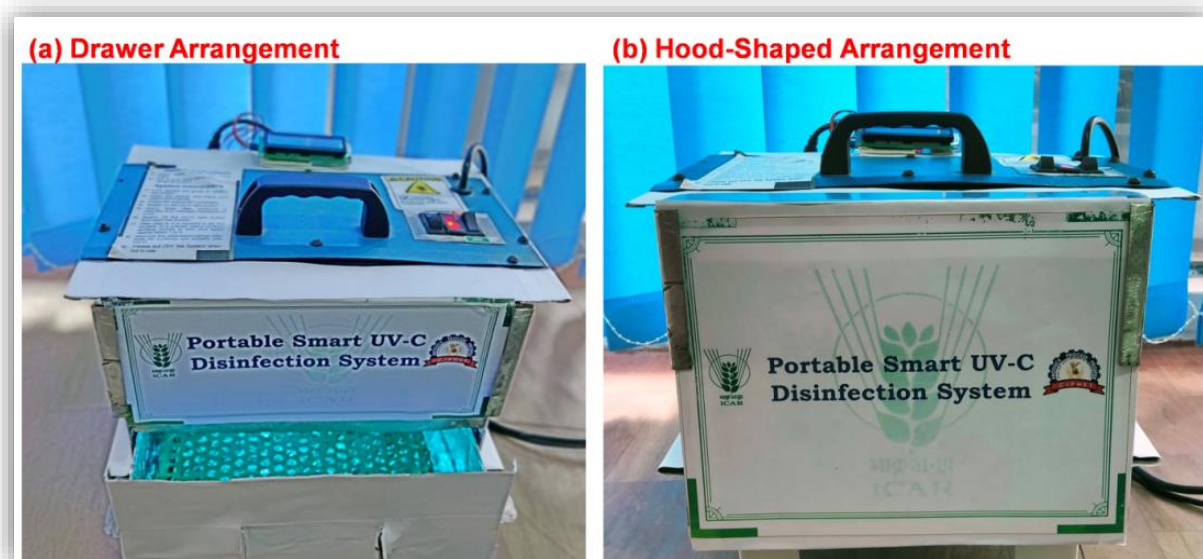
In general, it is not feasible to disinfect each paper, file and similar items using the alcohol-based sanitizing gel. Thus, such a compact, smart and efficient system is needed to disinfect such items, in reducing the risk of infection among people. Unlike chemical sanitizers, UV-C does not leave a residue and does not require extensive safety equipment. It works as a mode of surface sterilization by destroying nucleic acid and disrupting the DNA of microorganisms. Single-stranded RNA viruses, such as Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), are generally inactivated by UVGI exposure of 2-5 mJ/cm<sup>2</sup>. Thus, in this study, the chosen UV-C exposure of 1.22 J/cm<sup>2</sup> (total dose) exceeds well above the amount of exposure needed to inactivate SARS-CoV-2 which is in line with the recent report of Nebraska Medicine (2020). The working capacity of the unit in terms of the total surface area of the objects to be treated/exposed is 25 × 25 cm<sup>2</sup>. The estimated cost of the unit is approximately Rs. 1500. However, the system can be scaled up as per the need.

### **Features of Portable Smart Ultraviolet-C Disinfection System (UViC)**

1. The portable system is made of food-grade stainless steel coated with reflective material on the inner surfaces.
2. The LCD can prompt the user to operate the system.
  - a. The system can be used in two modes: **For lightweight removable objects:** A drawer arrangement for placing objects, for example, purse, wallets, phones, currency notes, papers, packed groceries, files, and mask.
  - b. **For items which are fixed on surfaces:** A hood-shaped arrangement that can be placed on fixed items.

3. Alarm beeps after a minimum of six minutes of treatment time and a message for completion of the disinfection process is displayed on LCD.
4. After completion of irradiation/treatment, switch off the UV-C light button and open the drawer to remove objects. It is advisable to flip (top becomes bottom) the object and irradiate it.
5. The users should avoid direct exposure of UV-C radiation on body parts, especially eye.

The system has been tested for inactivation of *Escherichia coli* as classic examples of gram-negative bacteria. In this experiment, *E. coli* was spread on LB agar plates and half portion of each plate was exposed to UV-C radiation. The influence of the treatment parameter, that is, the time has been investigated on *E. coli*. Findings indicated that no visible *E. coli* colonies were observed after six minutes of continuous UV-C exposure.



**Fig. 1: Portable Smart UV-C Disinfection System (UViC): (a) drawer arrangement; (b) hood-shaped arrangement.**

The developed system is unique, portable and cost-effective which can be installed in offices, homes, shops, hospitals, malls etc. This portable system has been designed and developed by Dr. K Narsaiah, Dr. Bhupendra M Ghodki, Er. Yogesh Kalnar and Ms. Surya Tushir under the guidance and encouragement of Dr. R.K. Singh, Director, ICAR-CIPHET, Ludhiana (Punjab).



**Fig. 2: Demonstrating of Portable Smart UV-C Disinfection System (UViC)**

**Technology licensing details**

S. No	Title	Contracting party	Licensing fee (Rs.)	Date of licensing
1.	Portable Smart Ultraviolet-C Disinfection System” (UViC)	M/s CRD Invotech, 38, Darda Nagar, Yavatmal - 445001, Maharashtra through its Proprietor Mrs. Snehal Dudhe	17,700	02.06.2020
		M/s Sakhi Soaps, Hindustan Soaps and Salts Company, Prakasam, Andhra Pradesh through its Manager Mr. A. Balaji	17,700	18.05.2020
		Mr. N K Dhir Ludhiana	17,700	27.06.2020

Licensee fee @ 15,000 + GST (18%)








**Fig 3. Transfer technology to M/s Sakhi Soaps, Hindustan Soaps and Salts Company, Prakasam, Andhra Pradesh through its Manager Mr. A. Balaji**



**Fig. 4 Technology transfer (UViC) to the young entrepreneur Mr. by ICAR-CIPHET, Ludhiana on 27 June 2020**

**Print Media Coverage:**

<p><b>News:Time of India Ludhiana 13/05/2020</b> <b>Page 3 Print Media</b></p>	<p><b>e-News:Time of India Ludhiana 14/05/2020</b></p>
<p><b>Icar-Cipheth develops portable ultraviolet disinfection system</b></p> <p>Ludhiana: Icar Cipheth (Indian Council of Agricultural Research Central Institute of Post Harvest Engineering and Technology) director RK Singh informed that in its contribution to help the nation fight the coronavirus menace, the institute has come out with an ultraviolet-C disinfection system (UViC), which can be used to sterilise daily use items. A few days ago, the institute had also developed a no-touch sanitiser dispenser.</p> <p>K. Narsiah, head of AS&amp;EC division, highlighted that non-ionising germicidal properties of artificial ultraviolet (UV-C) radiation can be used for surface disinfection. Unlike chemical sanitisers, UV-C does not leave a residue, and does not require extensive safety equipment. It works as a mode of surface sterilisation by destroying</p>  <p>The Icar-Cipheth developed disinfection machine</p> <p>for example, purse, wallets, phones, currency notes, papers, packed groceries, files, and masks; (ii) a hood-shaped arrangement that can be placed on fixed items, such as door handle, latches, and other surfaces.</p> <p>The system has been tested for its disinfection properties against Escherichia coli after UV-C exposure of six minutes. The results showed that the growth was nil after incubation of 24 hours. Interest in this technology is quite high because of its easy implementation and inexpensiveness.</p> <p>In general, it is not feasible to disinfect each paper, file, and similar items using an alcohol-based sanitising gel. Thus, such a compact and smart system is critical in reducing the risk of infection among people as well, and can be used by the corona warriors.</p>	<p><b>Icar-Cipheth develops portable ultraviolet disinfection system</b></p> <p>LUDHIANA: Icar-Cipheth (Indian Council of Agricultural Research Central Institute of Post-Harvest Engineering and Technology) director RK Singh informed that in its contribution to help the nation fight the coronavirus menace, the institute has come out with an ultraviolet-C disinfection system (UViC), which can be used to sterilise daily use items. A few days ago, the institute had also developed a no-touch sanitiser dispenser.</p> <p>K. Narsiah, head of AS&amp;EC division, highlighted that non-ionising, germicidal properties of artificial ultraviolet (UV-C) radiation can be used for surface disinfection. Unlike chemical sanitisers, UV-C does not leave a residue, and does not require extensive safety equipment. It works as a mode of surface sterilisation by destroying nucleic acid and disrupting the DNA of microorganisms.</p> <p>Bhupendra M Ghodki, Yogesh Kalnar, and Surya Tushir designed this innovative system based on available studies on Severe Acute Respiratory Syndrome Coronavirus 1 (Sars Cov 1) that caused a global epidemic in 2002-2003. The system is low-cost, based on UV-C technology, having an LCD and an alarm unit. The working capacity (surface area) of the unit is 25x25sq cm, with an estimated unit cost of Rs1500. However, the system can be scaled up as per the need.</p> <p>The portable system is made of food-grade stainless steel, coated with reflective material on inner surfaces. This system can be used in two modes: (i) a drawer arrangement for placing portable objects — for example, purse, wallets, phones, currency notes, papers, packed groceries, files, and masks; (ii) a hood-shaped arrangement that can be placed on fixed items, such as door handle, latches, and other surfaces.</p> <p>The system has been tested for its disinfection properties against Escherichia coli after UV-C exposure of six minutes. The results showed that the growth was nil after incubation of 24 hours. Interest in this technology is quite high because of its easy implementation and inexpensiveness.</p> <p>In general, it is not feasible to disinfect each paper, file, and similar items using an alcohol-based sanitising gel. Thus, such a compact and smart system is critical in reducing the risk of infection among people as well, and can be used by the corona warriors.</p>
<p><b>Agri News Network: E-article 15/05/2020</b></p>	<p><b>Jagbani 21/05/2020, Ludhiana News: Page 2</b></p>
 <p><b>CIPHET Ludhiana develops Portable Smart Ultraviolet-C Disinfection System (UViC)</b></p>  <p><b>Dr. K. Narsiah</b>, Head AS&amp;EC Division, ICAR-CIPHET, Ludhiana <b>Dr. Bhupendra M Ghodki</b>, AS&amp;EC Scientist (Operational Systems), ICAR-CIPHET, Ludhiana <b>Er. Yogesh Kalnar</b>, AS&amp;EC Scientist (Structures and Process Engineering), ICAR-CIPHET, Ludhiana <b>Ms. Surya Tushir</b>, AS&amp;EC Scientist (Applied Microbiology), ICAR-CIPHET, Ludhiana <b>Dr. R. K. Singh</b>, Director, ICAR-CIPHET, Ludhiana</p>	 <p>ਸੰਢਿਟ ਵਿਗਿਆਨੀ ਤਕਨੀਕੀ ਸੰਢਿਟ ਵਿਗਿਆਨੀਆਂ ਨਾਲ ਕਰਾਰ ਕਰਦੇ ਹੋਏ...</p> <p>ਜਾਂਘਰਾਂ ਵਿਚ ਇਸ ਨੂੰ ਵਰਤੋਂ ਵਿਚ ਲਿਆਂਦਾ ਜਾ ਸਕਦਾ ਹੈ। ਉਨ੍ਹਾਂ ਦੱਸਿਆ ਕਿ ਇਹ ਉਦਯੋਗਿਕ ਕੰਪਨੀਆਂ ਦੇ ਨਾਲ ਇਸ ਤਕਨੀਕ ਸੰਢਿਟ ਕਰਾਰ ਕੀਤਾ ਗਿਆ ਹੈ। ਉਨ੍ਹਾਂ ਦੱਸਿਆ ਕਿ ਡਾ. ਆਰ. ਕੇ. ਸਿੰਘ ਨਿਰਦੇਸ਼ ਸੰਢਿਟ ਦੀ ਅਗਵਾਈ ਵਿਚ ਵਿਗਿਆਨੀਆਂ ਦੀ ਟੀਮ ਵਿਚ ਡਾ. ਕੇ. ਨਰਸੀਆ, ਇੰਜੀਨੀਅਰ ਯੋਗੇਸ਼ ਭਾਸਕਰ ਕਲਨਾਰ, ਡਾ. ਭੁਪੇਂਦਰ ਮੋਹੰਡਾ, ਮਿਸ ਸੁਰਯਾ ਸ਼ਾਲਾ ਤਰੀ। ਨਿਰਦੇਸ਼ਕ ਡਾ. ਆਰ. ਕੇ. ਸਿੰਘ ਨੇ ਕਿਹਾ ਕਿ ਉਹ ਹਰ ਸੰਢਿਟ ਖਤਰਨਾਕ ਕਰਨਗੇ ਕਿ ਤਕਨੀਕੀ ਮਦਦ ਨਾਲ ਹੀ ਦੋਵੇਂ ਵਿਗਿਆਨੀਆਂ ਖੋਜਾਂ ਵਿਚ ਮਦਦ ਨਹੀਂ ਦਿੱਤੀ ਜਾਵੇਗੀ ਕਿਸੇ ਮੁਸ਼ਕਲ ਦੇ ਕਰਨ ਲੱਗੇ। ਕਰਾਰ ਦੇ ਸਮੇਂ ਡਾ. ਰਣਜੀਤ ਸਿੰਘ ਮੁਖੀ ਅਠਵਾਰਾ ਇਲਾਹੀ ਪ੍ਰਬੰਧਨ ਵਿਕਾਸੀ ਕੀ ਹਾਕਮ ਸਨ।</p>

**Website Coverage (eNews):**

1. <https://icar.org.in/content/icar-cipheth-ludhiana-develops-E2%80%9Cportable-smart-ultraviolet-c-disinfection-system%E2%80%9D-uvic> (ICAR New Delhi 27/05/2020).
2. <https://www.cipheth.in/ News: ICAR-CIPHET Ludhiana 13/05/2020>
3. <https://www.cipheth.in/newshighlights.php?nh=220> ICAR-CIPHET Ludhiana 13/05/2020
4. [https://www.cipheth.in/photo\\_gallery.php](https://www.cipheth.in/photo_gallery.php) Photo Gallery: ICAR-CIPHET Ludhiana 14/05/2020
5. [https://www.cipheth.in/photo\\_gallery.php](https://www.cipheth.in/photo_gallery.php) Media Coverage: ICAR-CIPHET Ludhiana 14/05/2020
6. [http://www.agrinewsnetwork.in/articles.php#art\\_99](http://www.agrinewsnetwork.in/articles.php#art_99). E-news

7. <https://www.cipheth.in/newshighlights.php> Technology Licensing News: ICAR-CIPHET, Ludhiana 21/05/2020
8. <http://epaper.jagbani.com/punjab/2020-05-21/ludhiana-bani#pages/2>
9. <https://www.cipheth.in/newshighlights.php> Tech Licensing 2 News: ICAR-CIPHET Ludhiana 04/06/2020
10. <http://toi.in/qG5o-b/a33gj> Technology Licensing News: 04/06/2020

### Video News and Twitter

1. <https://youtu.be/NJzSZAU4c3k><https://youtu.be/7yBa7USDcMI>
2. <https://twitter.com/Asylumseeker00/status/1266581528361881600?s=09>
3. <https://twitter.com/ANI/status/1266581309125619714?s=09>
4. <https://youtu.be/ehffHGtJhJ8>.
5. <https://www.etvbharat.com/punjabi/punjab/city/ludhiana/pau-developed-4-different-machines-to-fight-coronavirus/pb20200529170744816>



**Fig.5: Certificate of Licensing to M/s Sakhi Shops (Andhra Pradesh) on 18.05.2020**











**Fig. 6: Certificate of Licensing to M/s CRD Invotech, (Maharashtra) on 02.06.2020**



**Fig.7: Certificate of Licensing to Mr. N K Dhir, (Ludhiana) on 27.06.2020**

## News Channel Coverage

S. No.	Name of the channel	Web link	Icon
1	Nav Bharat Times	Video News and Twitter <a href="https://youtu.be/NJzSZAU4c3k">https://youtu.be/NJzSZAU4c3k</a> <a href="https://youtu.be/7yBa7USDcMI">https://youtu.be/7yBa7USDcMI</a>	 NBT नवभारत टाइम्स
2	News 18 lokmat	<a href="https://m.youtube.com/watch?v=i01iQg9mWtI">https://m.youtube.com/watch?v=i01iQg9mWtI</a>	 NEWS 18 लोकमत
3	ANI	<a href="https://youtu.be/ehffHGtJhJ8">https://youtu.be/ehffHGtJhJ8</a>	 ANI NEWS INDIA All News, Local, Web & YouTube Channel
4	NMF news	<a href="https://www.youtube.com/watch?v=ZwQ-dlw14fM">https://www.youtube.com/watch?v=ZwQ-dlw14fM</a>	 NFM
5	India TV news	<a href="https://www.indiatvnews.com/video/news/ludhiana-scientists-develop">https://www.indiatvnews.com/video/news/ludhiana-scientists-develop</a>	 INDIA TV
5	Jagbani TV	<a href="https://www.youtube.com/watch?v=NJzSZAU4c3k&amp;feature=youtu.be">https://www.youtube.com/watch?v=NJzSZAU4c3k&amp;feature=youtu.be</a>	 जग घाटी
6	News 9	<a href="https://www.youtube.com/watch?v=ehffHGtJhJ8&amp;feature=youtu.be">https://www.youtube.com/watch?v=ehffHGtJhJ8&amp;feature=youtu.be</a>	 NEWS 9
7.	ETV Bharat	<a href="https://www.etvbharat.com/punjabi/punjab/city/ludhiana/pau-developed-4-different-machines-to-fight-coronavirus/pb20200529170744816">https://www.etvbharat.com/punjabi/punjab/city/ludhiana/pau-developed-4-different-machines-to-fight-coronavirus/pb20200529170744816</a>	 ETV BHARAT

### Technology # 3

#### No-Touch Automatic Dispenser for hand sanitization

**Research team:** Er. Yogesh B. Kalnar & Dr. Rahul Kumar Anurag

COVID-19 is a pandemic which is creating havoc in the world, and the infection caused by the virus is daily increasing its count in entire country. People can catch COVID-19 from others who have the virus by coming in touch with the small droplets blown out of from nose or mouth in form of coughs or exhales. Outside environment can have the virus on objects, surfaces etc. and chances of coming across the virus increases in public places. Mostly people can catch COVID-19 by touching these objects or surfaces. Hand sanitation and washing has become a routine practice. But people are using bottles of sanitizers which requires a touch to press for getting sanitizer out for its use. This practice may become a source of infection for the healthy person in the office, hospitals, grocery stores, mandis, warehouses and public places. Ministry of Health and Family Welfare, Government of India suggested that frequently clean your hands thoroughly with an alcohol-based hand rub or wash them with soap and water. By doing this one can bring down the chances of getting infection.



**Fig. 1: Demonstration of No-Touch Automatic Dispenser for sanitizer at ICAR-CIPHET, Ludhiana, Punjab.**



**Fig. 2 First and second prototype of dispenser**

Public and administration officials dealing in papers, files are prone to this and there comes the need of frequent hand sanitation. Corona warriors, doctors, hospital staff, media personals, volunteers, and government officials attending duties for the sake of people's convenience are at risk. However, the need arises for a device that is touch-free, portable, low-cost, and dispense scientifically proven known volume of the hand sanitizer automatically to the users. Keeping in view the need of the hour, the ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana has developed a sensor-based smart, touch-free, low cost, and portable device for the automatic dispensing of sanitizer solution. This smart device comprises of two parts *viz.* hardware and software. Hardware includes a microcontroller, proximity sensor based on IR light, pump, a plastic tank that is rated as compatible for storage of alcohol-based sanitizer, wiring, power source, and an outer casing made up of stainless steel. The software component includes integrated development environment (IDE) that provides comprehensive facilities to programming for software development. An IDE normally consists of a source code editor, debugger, and facility to upload the code on the hardware component. All the components are easily available in the market.

The device works on the principle of automatic obstacle detection with infra-red proximity sensor; and actuating the pump with the help of control unit/microcontroller. This device dispenses the alcohol-based hand rub sanitizer from tank (adjustable capacity) using a small yet powerful diaphragm pump. The

software controls the dispensing volume of about 3ml in one go; which can be further increased or decreased volumetrically, by changing the program in the software. The instant dispense of the sanitizer is possible once the proximity sensor senses the presence of hindrance by hands. The user can collect the dispensed volume of liquid from the device in the cupped hand. The device is compact in design, requiring a small space of 30 cm length, 30 cm height and 20 cm width which may vary with the capacity. The device was made with unit cost of Rs. 1500 and it is installed at ICAR-CIPHET, Ludhiana for the use of office staff. The efficient and touch-free mechanism reduces the risk of infection at use in public places and ensures the right volume as per the requirement of the user for hand sanitation purpose. The device operates on a 5-12V DC electric power supply. This small and smart device can be placed on the entry platform of needing organization and can play a vital role in reducing the risk of infection.

ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana has licensed the developed technology to two firms viz. M/s Forming and Forging Industries, Gill Road Ludhiana and the other to the M/s Sakhi Soaps, Hindustan Soaps and Salts Company, Ongole, Andhra Pradesh.



**Fig. 3 Licensing of no-touch sanitizer dispenser technology to the two different firms.**



## Technology licensing:

S. No	Title	Contracting party	Licensing fee (Rs)	Date of licensing
1	No-Touch Automatic Dispenser for hand sanitization	M/s Forming & Forging Industries, #3858, St. - 1, New Janta Nagar, Gill Road Ludhiana-141003 through its Managing partner S. Dilraj Singh	15000	18.5.2020
		M/s Sakhi Soaps, Hindustan Soaps and Salts Company, Prakasam, Andhra Pradesh through its Manager Mr. A. Balaji	15000	18.5.2020

Licensee fee @ Rs. 15,000 + GST (18%)

## Print Media Coverage

Times of India: May 3, 2020

### ICAR develops low cost, no-touch sanitiser dispenser

Mehak Jain | TNN

Ludhiana: The ICAR-CIPHET, central research institution on Punjab Agriculture University (PAU) campus has come up with a low-cost and effective compact touch-free hand sanitiser amid the Covid-19 crisis.

Institute scientists Yogesh Kalnar, and Dr Rahul Kumar Anurag have integrated an infra-red sensor into an electronically operated smart device, which dispenses about 3ml of the scientifically prepared alcohol-based hand sanitizer as per the World Health Organisation (WHO) guidelines.

Director ICAR-CIPHET Dr RK Singh said, "The device is a need-based solution for public organizations where staff members can use the sanitizing dispenser for hand sanitation to deal with Covid-19 infection, as it is a low-cost smart device. The prototype that consists of a miniature diaphragm pump and IR proximity sensor based on adreno electronics has been installed at the entrance gate of the main building of the institute."

Scientists detailed that rubbing hands with hand sanitizer upto 30 seconds was important and said this low-



An ICAR scientist with the prototype of the hand sanitising machine on PAU campus

cost device needed to be replicated at every public location. "This need-based automatic device can dispense touch-free hand sanitizer and can bring down the risk of infection."

Dr Anurag said, "During these testing times of Covid-19 spread, the entire country is in lockdown and hygiene safeguard measures are of great concern at public places. Corona warriors, doctors, hospital staff, media and government officials attending duties are at risk and hand sanitation practices has become more frequent now. There is a need for touch-free dispensing of the hand sanitizer liquid solution."

Jagbani (Punjabi Newspaper): May 6, 2020

### ਕੋਰੋਨਾ ਨਾਲ ਲੜਨ ਲਈ ਸੀਫਟ ਦੇ ਵਿਗਿਆਨੀਆਂ ਨੇ ਤਿਆਰ ਕੀਤਾ ਪੋਰਟੇਬਲ ਸਿਸਟਮ











ਸੀਫਟ ਵਿਗਿਆਨੀ ਤਕਨੋਲੋਜੀ ਸਬੰਧੀ ਉੱਦਮੀਆਂ ਨਾਲ ਕਰਾਰ ਕਰਦੇ ਹੋਏ।

ਲੁਧਿਆਣਾ, 20 ਮਈ (ਸਲੂਜਾ)-ਸੈਂਟਰਲ ਇੰਸਟੀਚਿਊਟ ਆਫ ਪੋਸਟ ਹਾਰਵੈਸਟ ਇੰਜੀਨੀਅਰਿੰਗ ਐਂਡ ਟੈਕਨੋਲੋਜੀ (ਸੀਫਟ) ਦੇ ਵਿਗਿਆਨੀਆਂ ਨੇ ਕੋਰੋਨਾ ਨਾਲ ਲੜਨ ਲਈ ਸੈਰ ਅਧਾਰਤ ਨੋ-ਟੈਚ ਸਮਾਰਟ ਪੋਰਟੇਬਲ ਸੈਨੀਟਾਈਜ਼ਰ ਡਿਸਪੈਂਸਿੰਗ ਸਿਸਟਮ ਅਤੇ ਪੋਰਟੇਬਲ ਯੂਵੀ-ਸੀ ਲਾਈਟ ਅਧਾਰਤ ਪੋਰਟੇਬਲ ਡਿਸਟ੍ਰਿਬਿਊਸ਼ਨ ਸਿਸਟਮ ਵਿਕਸਿਤ ਕੀਤਾ ਹੈ। ਜਾਣਕਾਰੀ ਦਿੰਦੇ ਹੋਏ ਸੀਫਟ ਦੇ ਵਿਗਿਆਨੀ ਡਾ. ਰਾਹੁਲ ਕੁਮਾਰ ਅਨੁਸਾਰ ਨੇ ਦੱਸਿਆ ਕਿ ਦੋਵੇਂ ਹੀ ਤਕਨੀਕ ਕੋਰੋਨਾ ਵਾਇਰਸ ਮਹਾਮਾਰੀ ਖਿਲਾਫ ਲੜਾਈ ਵਿਚ ਇਸ ਮਦਦਗਾਰ ਅਤੇ ਘੱਟ ਖਰਚ ਵਾਲੀ ਸਮਾਰਟ ਕੰਪੈਕਟ ਤਕਨੀਕ ਹੈ, ਜਿਸ ਦੀ ਵਰਤੋਂ ਕਰ ਕੇ ਆਵਿਸ਼ਾਂ, ਹਸਪਤਾਲਾਂ, ਦੁਕਾਨਾਂ, ਮਾਲ ਆਦਿ ਜਾਂ ਹੋਰਨਾ ਦਫਤਰਾਂ

ਜਾਂ ਘਰਾਂ ਵਿਚ ਇਸ ਨੂੰ ਵਰਤੋਂ ਵਿਚ ਲਿਆਂਦਾ ਜਾ ਸਕਦਾ ਹੈ। ਉਨ੍ਹਾਂ ਦੱਸਿਆ ਕਿ ਦੋ ਉਦਯੋਗਿਕ ਕੰਪਨੀਆਂ ਦੇ ਨਾਲ ਇਸ ਤਕਨੀਕ ਸਬੰਧੀ ਕਰਾਰ ਵੀ ਕੀਤਾ ਗਿਆ ਹੈ। ਉਨ੍ਹਾਂ ਦੱਸਿਆ ਕਿ ਡਾ. ਆਰ. ਕੇ. ਸਿਘ ਨਿਰਦੇਸ਼ ਸੀਫਟ ਦੀ ਅਗਵਾਈ ਵਿਚ ਵਿਗਿਆਨੀਆਂ ਦੀ ਟੀਮ ਵਿਚ ਡਾ. ਕੇ. ਨਰਸੋਈਯਾ, ਇੰਜੀਨੀਅਰ ਯੋਗੇਸ਼ ਭਾਸਕਰ ਕਲਨਾਰ, ਡਾ. ਭੁਪਿੰਦਰ ਐੱਮ. ਘੋਸ਼ਕੀ, ਮਿਸ ਸੂਰਯਾ ਸ਼ਾਮਲ ਰਹੀ। ਨਿਰਦੇਸ਼ਕ ਡਾ. ਆਰ. ਕੇ. ਸਿਘ ਨੇ ਕਿਹਾ ਕਿ ਉਹ ਹਰ ਸੰਭਵ ਯਤਨ ਕਰਨਗੇ ਕਿ ਤਕਨੀਕੀ ਮਦਦ ਨਾਲ ਹੀ ਦੋਵੇਂ ਉੱਦਮੀ ਇਨ੍ਹਾਂ ਯਤਨਾਂ ਦਾ ਉਤਪਾਦਨ ਬਿਨਾਂ ਕਿਸੇ ਮੁਸ਼ਕਲ ਦੇ ਕਰਨ ਲੱਗੇ। ਕਰਾਰ ਦੇ ਸਮੇਂ ਡਾ. ਰਣਜੀਤ ਸਿੰਘ ਮੁਖੀ ਅਦਾਰਾ ਇੰਡਸਟਰੀ ਪ੍ਰਬੰਧਨ ਇਕਾਈ ਵੀ ਹਾਜ਼ਰ ਸਨ।

## News channel coverage

S. No.	Name of the channel	Web link	Icon
1	Nav Bharat Times	<a href="https://navbharattimes.indiatimes.com/video/news/ludhiana-scientists-develop-low-cost-touch-free-hand-sanitiser-disinfection-system/videoshow/76109744.cms">https://navbharattimes.indiatimes.com/video/news/ludhiana-scientists-develop-low-cost-touch-free-hand-sanitiser-disinfection-system/videoshow/76109744.cms</a>	
2	News 18 lokmat		
3	ANI	<a href="https://www.youtube.com/watch?v=Hf6Mh1eJYA">https://www.youtube.com/watch?v=Hf6Mh1eJYA</a>	
4	NMF news	<a href="https://www.youtube.com/watch?v=ZwQ-dlw14fM">https://www.youtube.com/watch?v=ZwQ-dlw14fM</a>	
5	India TV news	<a href="https://www.indiatvnews.com/video/news/ludhiana-scientists-develop-low-cost-touch-free-hand-sanitiser-disinfection-system-621931">https://www.indiatvnews.com/video/news/ludhiana-scientists-develop-low-cost-touch-free-hand-sanitiser-disinfection-system-621931</a>	
5	Jagbani TV Punjab Kesari	<a href="https://www.youtube.com/watch?v=NJzSZA U4c3k&amp;feature=youtu.be">https://www.youtube.com/watch?v=NJzSZA U4c3k&amp;feature=youtu.be</a>	
6	News 9	<a href="https://www.youtube.com/watch?v=ehffHGtJhJ8&amp;feature=youtu.be">https://www.youtube.com/watch?v=ehffHGtJhJ8&amp;feature=youtu.be</a>	
7.	ETV Bharat	<a href="https://www.etvbharat.com/punjabi/punjab/city/ludhiana/pau-developed-4-different-machines-to-fight-coronavirus/pb20200529170744816">https://www.etvbharat.com/punjabi/punjab/city/ludhiana/pau-developed-4-different-machines-to-fight-coronavirus/pb20200529170744816</a>	

## Websites coverage

1. <https://timesofindia.indiatimes.com/city/ludhiana/icar-develops-no-touch-sanitiser-dispenser/articleshow/75513045.cms>
2. <https://www.financialexpress.com/lifestyle/health/hand-sanitiser-icar-ciphet-develops-touch-free-dispenser-in-wake-of-covid-19-pandemic/1947949/>
3. <https://in.news.yahoo.com/ludhiana-based-icar-ciphet-develops-125900926.html>
4. <https://www.news18.com/news/india/ludhiana-based-icar-ciphet-develops-touch-free-dispenser-for-hand-sanitiser-2605341.html>
5. <https://www.gadgetsnow.com/tech-news/punjab-institute-develops-touch-free-hand-sanitiser-dispenser/articleshow/75537966.cms>
6. <https://mybs.in/2YN8rZN>
7. [https://www.outlookindia.com/newscroll/hand-sanitiser-icarciphet-develops-touchfree-dispenser/1823431?utm\\_source=amp&utm\\_medium=wa&utm\\_campaign=amp](https://www.outlookindia.com/newscroll/hand-sanitiser-icarciphet-develops-touchfree-dispenser/1823431?utm_source=amp&utm_medium=wa&utm_campaign=amp)
8. <https://www.deccanherald.com/science-and-environment/hand-sanitiser-icar-ciphet-develops-touch-free-dispenser-833484.html>
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10. <https://icar.org.in/hi/content/icar-ciphet-ludhiana-develops-touch-free-automatic-dispenser-hand-sanitization>
11. <https://m.dailyhunt.in/news/india/english/edexlive-epaper-edex/icar+ciphet+develops+touch+free+dispenser+for+hand+sanitisers-newsid-182548724/amp>
12. <https://www.edexlive.com/happening/2020/may/04/icar-ciphet-develops-touch-free-dispenser-for-hand-sanitisers-11787.html>
13. [https://m.facebook.com/story.php?story\\_fbid=2882994075141831&id=535536636554265&s\\_cmts=scwsplos](https://m.facebook.com/story.php?story_fbid=2882994075141831&id=535536636554265&s_cmts=scwsplos).


भा. कृ. अनु. परि.-केन्द्रीय कटाई उपरान्त अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, लुधियाना  
(पंजाब)

ICAR- Central Institute of Post-Harvest Engineering and Technology, Ludhiana (Punjab)



### CERTIFICATE OF LICENSING

This is to certify that ICAR-CIPHET Ludhiana has granted the license of Technology entitled “No-Touch Automatic Dispenser for hand sanitization” to M/s Sakhi Soaps, Hindustan Soaps and Salts Company, Prakasam, Andhra Pradesh through its Manager Mr. A.Balaji on 18.05.2020.

  
Ranjeet Singh  
I/C ITMU

  
R.K.Singh  
Director (Acting)

Date: 18-05-2020  
Place: ICAR- CIPHET, Ludhiana

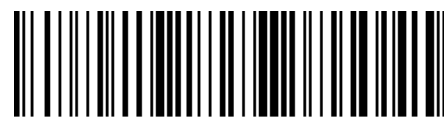
Fig. 4: Certificate of Licensing to M/s Sakhi Shops (Andhra Pradesh) on 18.05.2020



**Produce**

**Process**

**Prosper**



ICAR CIPHET