

# Indian Science in Indian Media



Highlights of India Science Wire (ISW) stories

June -2019

## **India Science Wire - highlighting Indian science in Indian media**

The coverage of science and technology particularly relating to research done in Indian research institutions, is generally very poor in Indian media. There are several reasons for this situation, one of them being the lack of credible and relevant science content. In order to bridge this gap, Vigyan Prasar launched a unique initiative - India **Science Wire (ISW)** – in January 2017.

The news service is dedicated to developments in Indian research laboratories, universities and academic institutions. Almost all news stories released by this service are based on research papers by Indian scientists published in leading Indian and foreign journals. All news stories and features are written and edited by a team of professional science journalists with decades of experience in science journalism.

News stories based on happenings in Indian research labs are released to media houses on a daily basis. These stories are also uploaded on ISW website and are simultaneously promoted through social media – Twitter and Facebook. At present, the service is available in English and Hindi.

Reach out ISW Editor with story ideas, comments and suggestions at [indiasciencewire@gmail.com](mailto:indiasciencewire@gmail.com)

ISW website: <http://vigyanprasar.gov.in/isw/isw.htm>



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## How Humans and Lesser Known Carnivores can Co-Exist

By S Suresh Ramanan | ISW | 03 June 2019



Two Indian striped hyenas spotted in wild.

( MN Jayakumar/BCCL/Bangalore)

Only four per cent of the geographic area of India is categorized as Protected Areas which are considered safe haven for animals. In addition, 18 per cent of the land is under forest cover which also harbours animals as well as humans.

The ecological health of forest landscape depends upon predators. The word predator, for most people, connotes lions and tigers. While tigers are protected well in tiger reserves that fall under Protected Areas, the last breeding population of Asiatic lion is confined to Gir in Gujarat. Therefore, the ecological well being of remaining forests depends upon lesser known carnivores like the grey wolf, dhole, jackal, fox and hyena – collectively called canids.

Human factors are leading to resource competition, ending up in human-animal conflicts and even threaten the very existence of these species. Understanding the needs of canids and humans to facilitate coexistence can help change the situation.

A team of researchers who studied this issue has suggested measures like preventing diversion of multi-use forests for development projects, strategies to reduce livestock depredation due to canids and increasing the efficiency of compensatory schemes to mitigate human-animal conflicts.

The study was done in the Kanha-Pench forest landscape which has all canids as well as human population in 400 villages. People depend on the forests for fuelwood, non-timber forest products as well as grazing for domestic livestock. Researchers assessed the ecological requirement of canids through an indirect sign survey and created species-specific occupancy models. They then collected data on socio-economic status of people like land holdings, livestock population, economic loss due to livestock depredation. They also collected data on free-ranging dogs to understand its interaction with wild canids. Modelling technique were used to assess the habitat use of canids and its depredation pattern.

It emerged that dholes were found predominately in forested areas; wolf, jackal and hyena occupied scrublands and fox in dry areas. Scrublands which are deemed to be unproductive and termed as ‘wastelands’ too have an ecological role. These wastelands tend to get converted into agriculture fields or diverted for commercial use. Conversion of these scrublands will directly have an impact on the canids, so these lands have to be managed scientifically, say researchers.

An important step is to ensure efficient system for payment of compensation to people for livestock lost. The local people are not claiming compensation as they find it difficult to establish proof of depredation by wild canids. The study has also warned about free-ranging dog in the forests. These dogs not only compete for the resources but also the source for diseases. In future, the dog population is bound to grow as they don't have any natural predators.

“Traditionally conservation and research has focused on animals that persist inside protected areas. Due to this, the conservation and management needs of several other species have been neglected. We need better understanding of carnivore distribution outside protected areas and also identify what factors influence their distribution and conflict with people,” pointed out Mahi Puri who led the research.

*This story was originally published in India Science Wire.*



By Dr. Aditi Jain

New Delhi, June 3: Cervical cancer or cancer of the uterine cervix is caused by abnormal growth of cells at the cervix, which can spread to other parts of the body. Researchers at the Noida-based ICMR-National Institute of Cancer Prevention and Research have found out why some women are prone to this cancer while others are not. This may help develop early diagnostic tests in future.

Researchers have found a correlation between the composition of three micro-RNA genes in the DNA and the risk for a person to develop cervical cancer. Micro-RNAs, which are small length genes, remain in the RNA form and do not get translated into proteins unlike most other genes. They bind to the RNA of a certain class of genes. In this way, a micro-RNA regulates the expression of a number of genes and processes in an individual.

It has emerged that the composition of the nucleotide at certain positions of micro-RNA genes – miR146, miR196a2 and miR499 – decides the risk for a woman to get cervical cancer.

Scientists decided to study these micro RNA genes as previous studies have shown that variations in nucleotide composition at particular positions of them affect susceptibility in several forms of cancer. They wanted to find whether it was the case for cervical cancer as well.

For this study, researchers took samples from 150 women with cervical cancer and another 150 women who had no cancer. DNA from these 300 samples was isolated, amplified and analysed for the three micro-RNA genes. It was found that women were more prone to cervical cancer if their micro-RNAs had this positioning of nucleobases- 60th nucleotide in microRNA miR146 was Guanine, 78th in miR196a2 was Cytosine and 73th in miR499 had Thymine.

“We checked the frequency of variation of nucleotides at a given position of miRNAs in cervical cancer patients and healthy individuals. In future, we would like to study the underlying mechanism associated with these single nucleotide polymorphisms in the development of the disease. This would definitely be a step towards the establishment of these microRNAs as potential biomarkers,” says Dr. Mausumi Bhardwaj, leader of the research team, while talking to India Science Wire.

“Cervical cancer constitutes the second most common malignancy in females in India and is responsible for 96,000 new cases and 60,000 deaths every year. It’s a national priority to conduct research on newer biomarkers for early diagnosis of this disease in order to reduce the morbidity and mortality due to this cancer,” explained Dr. Ravi Mehrotra, Director, NICPR, while speaking to India Science Wire

The research team included Nisha Thakur, Pallavi Singhal Mehrotra, Dr. Mausumi Bhardwaj and Dr. Mehrotra. The study results have been published in the journal Bioscience Reports

(India Science Wire)

## फूलों को सुखाने में मदद करेगा सोलर ड्रायर, नहीं खराब होगी गुणवत्ता

इस तरह सुखाए गए फूल और पत्तियों का इस्तेमाल ग्रीटिंग कार्ड, वॉल प्लेट्स, लैंडस्केप और कैलेंडर जैसी कलात्मक सजावटी वस्तुएं बनाने में किया जा सकता है। सोलर ड्रायर का उपयोग फूलों के अलावा फल, सब्जियों और औषधीय फसलों को सुखाने के लिए भी कर सकते हैं।

3 Jun 2019



भारत से निर्यात होने वाले फूल उत्पादों में 70 प्रतिशत हिस्सेदारी सूखे फूलों और पौधों के अलग-अलग भागों की होती है। लेकिन सूखे फूल उत्पादों के वैश्विक बाजार में भारत की भागीदारी सिर्फ पांच प्रतिशत है। भारतीय शोधकर्ताओं ने अब एक सोलर ड्रायर विकसित किया है जो गुलाब और गेंदे जैसे अधिक महंगे फूलों की सुंदरता और गुणों को नुकसान पहुंचाए बिना सुखाने में उपयोगी हो सकता है।

इस सोलर ड्रायर को विकसित करने वाले शोधकर्ताओं में शामिल नई दिल्ली स्थित भारतीय कृषि अनुसंधान संस्थान के वैज्ञानिक डॉ. पी. के. शर्मा ने बताया, "सोलर ड्रायर और सीधे धूप में सुखाए गए फूलों के रंग, रूप और आकार का मूल्यांकन करने पर हमने पाया कि बाहरी वातावरण की अपेक्षा सोलर ड्रायर में तापमान स्थिर रहता है। इसमें सुखाने की दर 65 से 70 प्रतिशत तक अधिक पायी गई है। बाहरी तापमान में उतार-चढ़ाव होता रहता और दोपहर के समय तो तापमान सबसे अधिक हो जाता है। इस कारण, खुली धूप में फूलों को

सुखाने से उनके रंग, रूप और आकार पर बुरा असर पड़ता है। जबकि, सोलर ड्रायर में फूलों की गुणवत्ता बनी रहती है।"



सोलर ड्रायर, ड्राइंग चैंबर और सौर ऊर्जा से संचालित एग्जास्ट फैन

इस सोलर ड्रायर को जस्ते की परत युक्त लोहे की चादर, हल्के स्टील, लोहे के एंगल, ग्रिल आदि के उपयोग से बनाया गया है। ड्रायर में हीटिंग और ड्राइंग दो चैंबर हैं और इसका कुल आयतन 1.04 घन मीटर है। ड्राइंग चैंबर में सामग्री के भंडारण के लिए 0.57 वर्ग मीटर के चार खंड बनाए गए हैं और ड्रायर का कुल भंडारण क्षेत्रफल 3.4 वर्ग मीटर है। ड्रायर को ढंकने के लिए कांच की शीट लगायी गई है, जिससे सौर विकिरण भीतर प्रवेश करके गरमी पैदा कर सके। ऊष्मा के अवशोषण को बढ़ाने के लिए ड्रायर के भीतरी हिस्से को काले रंग से पेंट किया गया है।

डॉ शर्मा ने बताया, "यह अक्षय ऊर्जा से संचालित ड्रायर है जिसके भीतर काले पेंट से रंगे हुए छोटे आकार के गोल पत्थर रखे गए हैं जो रॉक-बेड की तरह काम करते हैं और हीटिंग चैंबर में ऊष्मा बनाए रखते हैं। ड्राइंग चैंबर से नम हवा हटाने के लिए इसमें सौर ऊर्जा से संचालित एग्जास्ट फैन लगाए गए हैं जो फूलों एवं पौधों के विभिन्न हिस्सों को तेजी से सुखाने में मदद करते हैं। रात के समय और बादल होने की स्थिति में सौर ऊर्जा इस ऊष्मा को बनाए रखने में मदद करती है। सोलर ड्रायर और सामान्य वातावरण के तापमान में करीब 26 डिग्री सेल्सियस का अंतर देखने को मिला है।"

सोलर ड्रायर के परीक्षण से पहले फूलों को पत्तियों तथा पौधों के अन्य भागों से अलग करके इन नमूनों का व्यास, लंबाई और वजन दर्ज किया गया है। फूलों में मौजूद नमी की मात्रा कम करने के लिए उन्हें 3-4 मिनट तक माइक्रोवेव में सुखाया गया और फिर उन्हें सिलिका जेल में डुबोकर नमूने तैयार किए गए हैं। इन नमूनों को सोलर ड्रायर में सुखाने के लिए रख दिया जाता है।

खुले में गुलाब के फूलों को सुखाने में करीब 54 घंटे लगते हैं, वहीं सोलर ड्रायर में इसकी गुणवत्ता बरकरार रखते हुए इसे लगभग 33 घंटों में ही सुखाया जा सकता है। इसी तरह, गेंदे को धूप में सुखाने में 48 घंटे से अधिक समय लगता है और गुणवत्ता कायम नहीं रह पाती। जबकि सोलर ड्रायर में करीब 27 घंटे में गेंदे के फूलों को सुखाकर बेहतर गुणवत्ता प्राप्त की जा सकती है।

सोलर ड्रायर की मदद से फूलों, पौधों की शाखाओं, टहनियों, पत्तों इत्यादि को सुखाकर लंबे समय तक उनकी ताजगी बनाए रखा जा सकता है। सुखाने से पहले ध्यान रखा जाता है कि फूलों या पौधों के हिस्सों का मूल आकार तथारंग नष्ट न होने पाएं ताकि इनका उपयोग आंतरिक सजावट के लिए किया जा सके।

उमाशंकर मिश्रा (इंडिया साइंस वायर)

## **AstroSat peers into the heart of Jellyfish galaxy**

India's space observatory provides insight into processes at work in the heart of jellyfish galaxy  
JO201

04-Jun-2019



Thiruvananthapuram, June 4 (India Science Wire): The Ultraviolet Imaging Telescope onboard India's space observatory, AstroSat, has provided an insight into processes at work in the heart of a jellyfish galaxy.

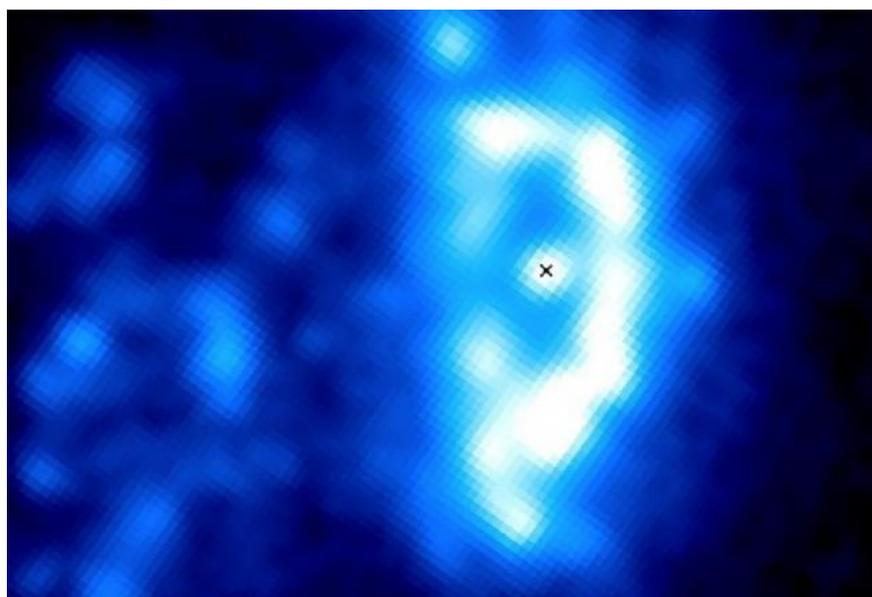
Researchers who studied the anatomy of a jellyfish galaxy called JO201 have found that it comprises of a central bright region surrounded by a bright broken ring-like emission structure. Ensnconced in between is a cavity or void like region of rather faint ultraviolet emission. The ultraviolet light from the bright ring is due to young stars formed in the last 200 to 300 million years.

By comparing this with images from other telescopes at different wavebands, researchers have shown that the cavity is due to the scarcity of young stars. This means no new stars have been formed in this cavity region for at least the last 100 million years.

Galaxies are very large aggregates of billions of stars held by the gravitation. Milky Way, our home galaxy is believed to house nearly ten billion stars with the Sun as one amongst

them. On a larger scale, it has been found that even galaxies flock together due to gravity in groups of hundreds to thousands, known as galaxy clusters.

The region between these galaxies is filled with very hot gas whose temperature can be as high as millions of degrees. As a galaxy moves through this hot gas, some of the cold gas in the galaxy's outer regions can be pulled back, leading to the formation of stars in structures that resemble tails or tentacles. This gives them the appearance of jellyfish, and hence, they are called jellyfish galaxies. One such jellyfish galaxy is JO201, which has been studied by astronomers from India and abroad as a part of an international collaboration called GASP.



“Galaxies come in two varieties - those that appear blue have young stars and are the star-forming variety, while red ones are those which have old stars and there has been no recent formation of stars in them,” explained K. George, who carried out the study at the Indian Institute of Astrophysics, Bangalore.

A blue galaxy can become red if it stops forming stars. Galaxies may stop forming stars due to various processes within the galaxy itself such as the effect of supermassive black hole at the centre; the presence of a rectangular bar-like structure which is made up of stars and located near the centre; or massive explosions accompanying stellar death called supernovae. The stripping of gas from the galaxy due to its motion in the hot gas between galaxies in a cluster could also impede the formation of stars.

Regarding the curbing of star-formation in this galaxy, researchers favour the hypothesis of the active galactic nucleus (AGN). Most large galaxies are believed to possess supermassive black-holes at their centres. The mass of these supermassive black holes could be hundreds of thousands to billions of times the mass of Sun. The gas and dust from the neighbourhood swirling at very high velocities into the supermassive blackhole increase the brightness of the central region multi-fold, and the galaxy is said to pass through an AGN phase.

In JO201, it is reported that the central region is bright in ultraviolet because of the AGN, and not due to young stars. The energy released from the AGN heats up cold gas clouds present close by. As stars are formed from cold gas clouds, this heating of gas leads to an arrest of star formation. This, in turn, results in a scarcity of young stars giving the galaxy a cavity-like appearance around the AGN.

The incomplete ring structure seen with lack of ultraviolet towards the left of the bright ring is explained due to the lack of young stars in this region. However, in this case, this cessation of star-formation is explained due to external effects, a result of gas being stripped out from this galaxy. Notice that this is the same side which has the tail like structure, far out in the galaxy.

According to the authors, this galaxy is unique as it provides direct evidence of internal and external mechanisms at work to halt the formation of stars in the galaxy.

The research results have been accepted for publication in the journal Monthly Notices of Royal Astronomical Society. The team included scientists from the GASP collaboration and the Indian Institute of Astrophysics. The picture of JO201 is the subject of the AstroSat Picture of the Month (APOM) series. AstroSat is India's first multi wavelength observatory launched by the Indian Space Research Organisation in September 2015.

(India Science Wire)

[Sarita Vig is an astrophysicist and an associate professor at the Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram]

*How humans and lesser known carnivores can coexist*

By S SURESH RAMANAN 05-06-2019

Only four per cent of the geographic area of India is categorized as Protected Areas which are considered safe haven for animals. In addition, 18 per cent of the land is under forest cover which also harbours animals as well as humans.

The ecological health of forest landscape depends upon predators. The word predator, for most people, connotes lions and tigers. While tigers are protected well in tiger reserves that fall under Protected Areas, the last breeding population of Asiatic lion is confined to Gir in Gujarat. Therefore, the ecological wellbeing of remaining forests depends upon lesser known carnivores like the grey wolf, dhole, jackal, fox and hyena - collectively called canids.

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**Mahi Puri interacting with tribal communities**

species. Understanding the needs of canids and humans to facilitate coexistence can help change the situation.

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**Collection of animal scats for ascertaining species identity.**

Collection of animal scats for ascertaining species identity. Modelling technique were used to assess the habitat use of canids and its depredation pattern.

It emerged that dholes were found predominately in forested areas; wolf, jackal and hyena occupied scrublands and fox in dry areas. Scrublands which are deemed to be unproductive and termed as 'wastelands' too have an ecological role. These wastelands tend to get converted into agriculture fields or diverted for commercial use. Conversion of these scrublands will directly have an impact on the canids, so these lands have to be managed scientifically, say researchers.

An important step is to ensure efficient system for payment of compensation to people for livestock lost. The local people are not claiming compensation as they find it difficult to establish proof of depredation by wild canids. The study has also warned about free-ranging dog in the forests. These dogs not only compete for the resources but also the source for diseases. In future, the dog population is bound to grow as they don't have any natural predators.

"Traditionally conservation and research has focused on animals that persist inside protected areas. Due to this, the conservation and management needs of several other species have been neglected. We need better understanding of carnivore distribution outside protected areas and also identify what factors influence their distribution and conflict with people," pointed out Mahi Puri who led the research.

The research team included Arjun Srivathsa and N. Samba Kumar from the Wildlife Conservation Society, Bengaluru; Krithi K. Karanth and Imran Patel from the Centre for Wildlife Studies, Bengaluru. The findings of the study have been published in the Royal Society Open Science Journal. (India Science Wire)

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## Both financial and non-financial factors matter for ASHAs: study

June 7, 2019



### **Monika Kundu Srivastava**

A major challenge faced by the Indian health system is to keep Accredited Social Health Activists (ASHAs) motivated and retain them in service. A new study has found that Accredited Social Health Activists (ASHAs) get motivated most by prospects of promotions than other factors.

*RESEARCHERS FROM THE GEORGE INSTITUTE FOR GLOBAL HEALTH AND SYDNEY UNIVERSITY UNDERTOOK A SURVEY OF 318 HEALTH WORKERS TO FIND OUT THEIR PRIORITIES. THE WORKERS*

*HAD TO CHOOSE ONE OF TWO JOBS THAT WERE  
BASED ON SALARY, WORKLOAD, TRAVEL  
ALLOWANCE, SUPERVISION AND OTHER JOB  
BENEFITS. THE STUDY WAS DONE IN GUNTUR  
DISTRICT IN ANDHRA PRADESH.*

Results indicated that prospects of promotion were the main motivator for 85% of the health workers. This was because promotion meant higher salary, more authority and recognition. The other factors that led to job satisfaction included a fixed salary as well as non-financial factors like free family health-checks and lesser workload.

The study also highlighted the fact that priorities of ASHAs were linked to their socioeconomic conditions. Community health workers who had other paid jobs prioritized free family health-checks. This could be because they may have had larger families needing more health visits and were more concerned that training might take them away from their families or cost them more days off their second jobs. Those who did not have second jobs and were less likely to be the main income earners for their families were more motivated by training and salaries.

Higher educated ASHAs prioritized career progression with a better pay and recognition. Less educated ASHAs were more interested in immediate high pay with no intention for further training to be promoted. The lesser educated also preferred jobs with lesser workload. This could be because they had larger families to look after and needed more time for that.

“There is a need to understand the preferences of health workers and certain aspects of career development valued by ASHAs. Non-financial and financial incentives should be combined to improve health workers satisfaction and their performance, which ultimately leads to better health outcomes,” said Dr Rohina Joshi, a member of the research team. Dr Marwa Abdel-All, lead author of the research study, recommends policies considering the preferences of health workers and prioritising them. This way, shortfall of health workers could be overcome.

The study results have been [published](#) in journal *BMJ Global Health*. The research team included Dr. Blake Angell, Prof. Stephen Jan, Dr. Martin Howell, Prof. Kirsten Howard, Dr. Seye Abimbola and Dr. Rohina Joshi.

*Courtesy: India Science Wire*

# DownToEarth

## Orange cucumber from North East is storehouse of Vitamin A: Study

At a stage when it is eaten as salad, the carotenoid content in orange-fleshed varieties was 2-4 times greater than the normal variety

By [Aditi Jain](#) Friday 07 June 2019



A [team of agricultural scientists](#) has found that orange-fleshed cucumber varieties from the North East are four to five times richer in carotenoid (pro-vitamin A) than the white-flesh varieties grown widely in other parts.

Orange-fleshed cucumbers are found in northeastern, tribal-dominated areas. The fruits are consumed cooked or as chutney. They are called 'Fanghma' and 'Hmazil' in Mizoram and 'Thabi' in Manipur.

The varieties caught the attention of researchers while they were characterizing indigenous germplasm of cucumber deposited at the National Bureau of Plant Genetic Resources (NBPGR). On further inspection, they found that they were collected from Manipur and Mizoram. Anticipating that orange color of the plants may correspond to high carotenoid content, they decided to study their characteristics and nutrient content in detail.

“A lot of fruits may provide the recommended daily intake of beta carotene/carotenoids. However, they may be beyond the reach of the poor in developing countries. Cucumber is available at an affordable cost throughout India. Identification and utilisation of carotenoid-rich landraces will definitely make a difference in our efforts in the area of nutritional security,” said Pragya Ranjan, a scientist at NBPGR and a member of the study team, while speaking to *India Science Wire*.

For this study, scientists grew three varieties (IC420405, IC420422, and AZMC-1) from Mizoram and one (KP-1291) from Manipur on their Delhi campus, along with Pusa Uday, a white-fleshed variety commonly grown in north India.

The orange-fleshed varieties showed similar content of total sugars and slightly higher content of ascorbic acid as the normal ones. However, the carotenoid content varied with the stage of cucumber.

At a stage when it is eaten as salad, the carotenoid content in orange-fleshed varieties was 2-4 times greater than the normal variety. On further maturity, however, orange cucumber may have 10-50 times more carotenoid content than the white variety.

Next, researchers evaluated the plants for acceptability of taste by asking 41 individuals to taste and score them. All the participants appreciated the unique aroma and taste of these cucumbers and accepted that it could be eaten as salad or in raita.

“The accessions with high carotenoid content may be utilised directly or as a parent in cucumber improvement programs,” said Ranjan.

The research team included Anjula Pandey, Rakesh Bhardwaj, KK Gangopadhyay, Pavan Kumar Malav, Chithra Devi Pandey, K Pradheep, Ashok Kumar (ICAR-NBPGR, New Delhi); AD Munshi and BS Tomar (ICAR-Indian Agriculture Research Institute). The study results have been published in the journal *Genetic Resources and Crop Evolution*.

**(India Science Wire)**



# जागरण

## मोहाली इंस्टीट्यूट के शोधकर्ताओं ने विकसित किया इंजेक्टेबल जेल, स्टेम सेल को बचाएगी नई हाइड्रोजेल

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बेंगलुरु, आइएसडब्ल्यू। चिकित्सा क्षेत्र में स्टेम कोशिकाओं का प्रत्यारोपण एक चुनौतीपूर्ण काम है क्योंकि इसमें प्रत्यारोपित कोशिकाओं के जीवित रहने से जुड़ी कई समस्याएं सामने आती हैं। स्टेम सेल, जब किसी घाव में प्रत्यारोपित किया जाता है, तो पैराक्रीन फैक्टर नामक रसायन छोड़ता है, जो ऊतक के पुनर्निर्माण के लिए आसपास की अन्य कोशिकाओं को प्रेरित करता है। भारतीय वैज्ञानिकों के एक समूह ने एक इंजेक्टेबल हाइड्रोजेल विकसित की है जो प्रत्यारोपित कोशिकाओं (स्टेम सेल) को लंबे समय तक जीवित रहने में मदद कर सकता है।

मोहाली के इंस्टीट्यूट ऑफ नैनोसाइंस एंड टेक्नोलॉजी के शोधकर्ताओं ने हाइड्रोजेल में मेसेनकेमल स्टेम सेल (एमएससी) को एनकैप्सुलेट कर इसे तैयार किया है। प्रारंभिक अध्ययनों में यह पाया गया है कि

हाइड्रोजेल सेल स्टेम कोशिकाओं को लंबे समय तक बनाए रखने में मदद करता है। यह हाइड्रोजेल प्राकृतिक मैटीरियल, जैसे- सेलूलोज, किटोजन से बनाया गया है और लगाने के एक महीने बाद स्वयं ही नष्ट हो जाता है। साथ ही इसमें अमीनो और एल्डिहाइड समूह के तत्व भी मौजूद हैं।

इस अध्ययन की मुख्य अन्वेषक डॉ. दीपा घोष ने बताया कि हाइड्रोजेल स्टेम कोशिकाओं को लंबे समय तक बनाए रखने में महत्वपूर्ण भूमिका अदा करता है और शरीर के ऊतकों के निर्माण में मदद करते हैं। उन्होंने बताया कि अध्ययन के दौरान हमने देखा कि इसके प्रयोग से न सिर्फ स्टेम सेल जीवित रहते हैं, बल्कि एक महीने के भीतर ही ऊतकों का पुनर्निर्माण कर यह स्वयं ही नष्ट हो जाता है।

उन्होंने कहा कि हाइड्रोजेल कोशिकाओं को सामान्य रूप से काम करने में भी मदद करता है। प्रत्यारोपण के बाद, हाइड्रोजेल में मौजूद पेरार्कीन कोशिकाओं के विकास और क्षतिग्रस्त ऊतकों की मरम्मत करने में सहायता करता है। इस अध्ययन के लेखक जिजयो थॉमस ने कहा कि इस हाइड्रोजेल में ऊतक कोशिकाओं के समान 95 फीसद पानी के तत्व हैं, जो कोशिकाओं में ऊतकों को व्यवस्थित करने में मदद करते हैं। इसके अलावा, यह जेल घाव के अनुरूप ही आकार भी ले सकती है, जिसका फायदा यह है कि इसे लगाने से घाव पूरा ढक जाएगा और किसी भी तरफ का इंफेक्शन होने की संभावना बहुत हद तक कम हो जाती है। इसमें मौजूद पेरार्कीन घाव को फैलने से भी बचाती है।

डॉ. दीपा घोष ने कहा कि पशुओं पर परीक्षण के दौरान हाइड्रोजेल हर परिस्थिति में खरा उतरा है। उम्मीद है कि भविष्य में यह तकनीक लोगों के घावों के उपचार में बेहद कारगर होगी और मरीजों जल्द स्वस्थ हो पाएंगे। आमतौर पर जखम ज्यादा गहरे होने पर जल्दी नहीं भर पाते, लेकिन शोधकर्ताओं का दावा है कि हाइड्रोजेल के जरिये घाव जल्दी ठीक हो सकता है। शोधकर्ताओं में दीपा घोष और के साथ जिजयो थॉमस के अलावा, अंजना शर्मा, विनीता पंवार और वियानी चोपड़ा शामिल थीं। इस अध्ययन के परिणाम एसीएस एप्लाइड बायोमेट्रिक्स जर्नल में प्रकाशित हुए हैं।

# दैनिक जागरण

## ऊर्जा का स्रोत बन सकती है अजैविक मीथेन

वारको-द-गामा (गोवा), आइसलैंडक्यू: पृथ्वी के भीतर पेट्रोलियम उत्पाद, कोयला और प्राकृतिक गैस जैसे हाइड्रोकार्बन ईंधनों का भंडार है। ये सभी जीवाश्म ईंधन हैं, जबकि कुछ हाइड्रोकार्बन, विशेष रूप से मीथेन, पृथ्वी के भीतर गहराई में जैविक और अजैविक दोनों प्रक्रियाओं से बनते हैं। पृथ्वी की सबसे ऊपरी सतह के नीचे मीथेन का अपार भंडार है। मीथेन रंगहीन तथा गंधहीन गैस है, जो प्राकृतिक गैस का मुख्य घटक है।

अमेरिका के डीप कार्बन ऑब्जर्वेटरी (डीसीओ) के वैज्ञानिकों ने दुनिया के बीस से अधिक देशों और कई गहरे महासागरीय क्षेत्रों में मीथेन के अजैविक उत्पात्त स्रोतों का पता लगाया है। वैज्ञानिकों के अनुसार, कुछ विशेष चट्टानों में पाए जाने वाले ओर्लिगिन नामक खनिज और पानी आपस में क्रिया करके हाइड्रोजन गैस बनाते हैं। यह हाइड्रोजन कार्बन स्रोतों, जैसे- कार्बन डाइऑक्साइड से क्रिया करके मीथेन बनाती है।

वैज्ञानिक इसी को अजैविक मीथेन कहते हैं क्योंकि यह बिना किसी जैविक आधार के निर्मित होती है। अध्ययन में यह भी पता चला है कि कुछ विशिष्ट सूक्ष्मजीव वास्तव में अजैविक मीथेन बनाने में मदद करते हैं। पृथ्वी में बहुत अधिक गहराई में मिलने वाले



मीथोनोजेन नामक ये सूक्ष्मजीव भू-रासायनिक क्रियाओं के दौरान बनने वाली हाइड्रोजन का उपयोग करके अपशिष्ट के रूप में मीथेन गैस का उत्सर्जन करते हैं। मीथेन ईंधन के रूप में उपयोग की जाती है। यह गैस धरती में पड़ी दरारों से निकलती है।

डीसीओ के वैज्ञानिकों ने लगभग तीन अरब वर्ष पहले महाद्वीपों के कोर में बनी चट्टानों, समुद्र तल में मध्य-महासागरीय चोटियों, ज्वालामुखियों की निकटवर्ती उच्च तापमान वाली जलतापीय नलिकाओं और विभिन्न महाद्वीपों के कई बेहद खारे झरनों और

जलकुंडों में अजैविक मीथेन की उपस्थिति का पता लगाया है। इन स्थानों में तुर्की को प्रसिद्ध फ्लेम्स ऑफ काइमिरा, ओमान के सीमेल ऑफियोलाइट, कनाडा की गहरी खदानें और मध्य अटलांटिक महासागर में लॉस्ट सिटी जलतापीय क्षेत्र शामिल हैं।

शोधकर्ताओं ने दुनियाभर से मीथेन के नमूने एकत्र किए हैं। कैलिफोर्निया इंस्टीट्यूट ऑफ टेक्नोलॉजी और मैसाचुसेट्स इंस्टीट्यूट ऑफ टेक्नोलॉजी के वैज्ञानिकों ने अजैविक मीथेन के रासायनिक घटकों का विश्लेषण किया है।

# DownToEarth

## How this bacterial strain from mosquito gut may help combat dengue

Researchers have been artificially infecting mosquitoes with Wolbachia, a bacteria that prevents replication of disease-causing virus in the guts of mosquitoes

By [S Suresh Ramanan](#) Last Updated: Friday 07 June 2019



One of the novel ways being experimented to control dengue and chikungunya is to release mosquitoes infected with a bacteria, Wolbachia, which prevents replication of disease-causing virus in the guts of mosquitoes. Now, Indian scientists have found that a strain of wolbachia naturally occurs in mosquito species, *Ae. Aegypti*, in South India.

Wolbachia is shown to hinder the replication and dissemination of pathogens in mosquito besides, inducing reproductive abnormalities. Therefore, researchers have been artificially infecting mosquitoes with wolbachia and exploring if such mosquitoes may be released to for controlling dengue.

Though, the prevalence of wolbachia in *Culex* mosquito was detected in 1924, the wolbachia infection of *Anopheles* mosquitoes was detected only in 2014. Now scientists in Coimbatore have identified a new strain of wolbachia belonging to the super group B in *Ae. Aegypti*.

“We wanted to find out if *Aegypti* mosquitoes from Western Ghats that invade Coimbatore city harbor wolbachia either as a free-living entity or integrated with the mosquito genome. The rationale in targeting *Aegypti* mosquitoes from Western Ghats was that they breed in the wild and this probably widens the scope to tap their diversity,” explain researchers from Bharathiar University and Pondicherry University who conducted the study.

Certain strains of wolbachia have proven efficient to interfere with mosquitoes' biology thereby reducing virus transmission. It is also safe to humans. That's why scientists have been trying to trans infect this bacterium into mosquito eggs artificially and release them. Mostly, the bacteria get expelled from the mosquitoes in subsequent generations, unless the infection happens in a natural way. So finding the natural occurrence of wolbachia strains in these mosquitoes is important.

The researchers collected mosquitoes from various regions of Coimbatore. They confirmed the presence of wolbachia using specific 16S rRNA gene primers and Multi Locus Sequence Typing. The team also examined the bacterial spread in the mosquito's body using Transmission Electron Microscopy. They found high bacterial density in

reproductive tissues compared to other body tissues. This implies the possibility of natural infection in the subsequent generations.

“Wolbachia inhibits viral replication in mosquitoes. This results in low viral concentration within mosquitoes, making them incapable of transmitting the disease. We are now studying the mechanism of reproductive abnormalities in mosquitoes caused by this bacterium as well as the impact of Wolbachia bacteria on replication of disease-causing viruses,” said Sivaraman Balaji, a member of the research team, while speaking to *India Science Wire*.

“Yet another dimension in the dynamics of control of *Ae. aegypti* mosquitoes is to look for variants in Wolbachia genome exhibiting potential traits which hitherto have not yet been studied nor exploited. More studies need to be carried out to assess its importance and efficacy in controlling *Ae. aegypti* population,” researchers have observed.

The study results have been published in the journal *FEMS Microbiology Letters*. The research included S. Jayachandran (Pondicherry University); SR Prabakaran and Sivaraman Balaji (Bharathiar University).

**(India Science Wire)**



Research Stash



## Scientists Pave the Way for A New Therapy for Type 2 Diabetes

Research Stash June 11, 2019

Researchers at the Bengaluru-based [National Centre for Biological Sciences](#) have come up with a finding that could pave the way for developing a new treatment for type 2 diabetes.



The scientists have found that an enzyme called PIP4K in the body plays a major role in determining the ability of cells to detect and respond to the hormone insulin. The reduced ability of cells to respond to insulin following a meal results in Type 2 diabetes. The condition is an important health problem. Globally, about 500 million suffer from it and in India, it is estimated that there are about 70 million diabetics.

With the new knowledge just reported, it may now become possible to address the problem. Scientists could now develop some therapeutic agent that could help inhibit the activity of the PIP4K enzyme, which could then produce more of the phosphoinositide lipids required for a better response to insulin and thus help type 2 diabetic patients.

Explaining their work, leader of the research team, [Prof. Raghu Padinjat](#) said, “Like the lights in a traffic signal which direct the flow of vehicles, organisms also produce many signals like hormones that direct how individual cells must behave. Further, various factors determine how cells in an organism respond to the hormones.

Insulin is one such hormone that signals cells to grow using nutrients like sugars. Our research has identified enzyme PIP4K as a factor that controls how cells respond to insulin. Fundamentally, PIP4K influences the levels of certain phosphoinositide lipids in cells. Changes in these phosphoinositide lipids, in turn, modified the effect of insulin on cells”.

He expressed the hope that over time the scientific community would be able to come with a new therapeutic agent for type 2 diabetes based on the study. “Our research work

has brought out an interesting connection between the PIP4K enzyme with insulin signaling. It shows how the effect of insulin on cells can be tuned by changing the function of PIP4K enzyme in cells. This is similar to how a rheostat works in an electrical circuit, e.g., like a regulator that controls the speed of a fan”.

The researchers conducted their study using *Drosophila*, commonly known as the fruit fly. Though only a fly, such organisms have many features/molecules that work in a common and universal manner similar to other animals including humans.

They chose it for their study since it is convenient and possible to understand the functions of many genes or proteins in a fruit fly by conducting various kinds of experiments, which may not be possible on bigger animal models and humans for ethical reasons. The work was performed through an interdisciplinary approach including fluorescence microscopy, molecular biology, and biochemistry.

The research team included Sanjeev Sharma, Swarna Mathre, Visvanathan Ramya, and Dhananjay Shinde. They have published a report on their study in *Cell Reports*. The work was supported by [Department of Biotechnology](#) under [Ministry of Science and Technology-Government of India](#) and a [Wellcome Trust-DBT India Alliance](#) Senior Fellowship along with National Centre for Biological Sciences. (India Science Wire)

By [Sunderarajan Padmanabhan](#)



# दैनिक जागरण

**नई तकनीक** ▶ आइआइटी खड़गपुर के छात्रों ने विकसित किया एंटीबायोटिक

## घाव भरेगा दही आधारित जेल

बैक्टीरिया की गति को धीमा कर संक्रमण को बढ़ने से रोकता है

नई दिल्ली, आइएसडब्ल्यू : दवाओं के खिलाफ बैक्टीरिया की बढ़ती प्रतिरोधक क्षमता के कारण कई बार घावों को भरने के लिए उपयोग होने वाले मरहम बेअसर हो जाते हैं, जिससे मामूली चोट में भी संक्रमण बढ़ने का खतरा रहता है। भारतीय प्रौद्योगिकी संस्थान (आइआइटी), खड़गपुर के वैज्ञानिकों ने अब दही आधारित ऐसा एंटीबायोटिक जेल विकसित किया है जो संक्रमण फैलाने वाले बैक्टीरिया की वृद्धि रोकने के साथ-साथ तेजी से घाव भरने में मददगार हो सकता है।

दही के पानी में जैविक रूप से सक्रिय पेप्टाइड्स होते हैं, जिनका उपयोग इस शोध में उपचार के लिए किया गया है। शोधकर्ताओं ने 10 माइक्रोग्राम पेप्टाइड को ट्राइफ्लूरोएसिटिक एसिड और जिंक नाइट्रेट में मिलाकर हाइड्रोजेल बनाया है। इस जेल की उपयोगिता का मूल्यांकन दवाओं के प्रति प्रतिरोधी क्षमता रखने वाले बैक्टीरिया स्टैफिलोकोकस ऑरियस और स्ट्रिप्टोमोनास एरुजिनोसा पर किया गया है। यह

दही के पानी में मौजूद पेप्टाइड में ट्राइफ्लूरोएसिटिक एसिड और जिंक नाइट्रेट मिलाकर बनाया हाइड्रोजेल

कोशिकाओं के जरिये किया क्षमता का आकलन



आइआइटी, खड़गपुर।

फाइल

हाइड्रोजेल इन दोनों बैक्टीरिया को नष्ट करने में प्रभावो पाया गया है। हालांकि, वैज्ञानिकों ने पाया कि स्ट्रिप्टोमोनास को नष्ट करने के लिए अधिक डोज देने की जरूरत पड़ती है।

आइआइटी, खड़गपुर की शोधकर्ता डॉ. शांति एम. मंडल ने बताया कि बैक्टीरिया समूह आमतौर पर किसी जैव-फिल्म को संश्लेषित करके उसके भीतर रहते हैं, जो उन्हें जैव प्रतिरोधी दवाओं से सुरक्षा प्रदान करती है। इस जैव-फिल्म का निर्माण बैक्टीरिया की गति पर निर्भर करता है। हमने पाया कि नया हाइड्रोजेल बैक्टीरिया की गति को धीमा करके जैव-फिल्म निर्माण को रोक देता है।

घावों को भरने में इस हाइड्रोजेल की क्षमता का आकलन करने के लिए वैज्ञानिकों ने

प्रयोगशाला में विकसित कोशिकाओं का उपयोग किया है। इसके लिए त्वचा कोशिकाओं को खुरचकर उस पर हाइड्रोजेल लगाया गया और 24 घंटे बाद उनका मूल्यांकन किया गया। इससे पता चला कि हाइड्रोजेल के उपयोग से क्षतिग्रस्त कोशिकाओं की प्रसार क्षमता बढ़ सकती है। इसी आधार पर शोधकर्ताओं का मानना है कि यह जैल घाव भरने में उपयोगी हो सकता है।

शोधकर्ताओं में डॉ. मंडल के अलावा, सौनिक मन्ना और डॉ. अनंता के. घोष शामिल थे। यह अध्ययन शोध पत्रिका फ्रंटियर्स इन माइक्रोबायोलॉजी में प्रकाशित किया गया है। शोधकर्ताओं ने कहा कि भविष्य में घावों को ठीक करने के लिए यह जेल प्रमुख दवा के रूप में इस्तेमाल की जा सकती है।

## For sound healing

IIT-Kharagpur scientists developed a gel from curd that retards the growth of antibiotic-resistant bacteria and enhances wound healing, illustrates Aditi Jain



Aditi Jain 16 Jun 2019 10:52 PM

Usually small cuts, bruises or wounds are harmless as the body has a system for repairing them. Often, antibiotic ointment is applied over them to prevent the growth of infection-causing microbes and to promote speedy healing. However, with the increasing presence of antibiotic-resistant bacteria in the environment, there is a danger that the ointments might not be able to stop the infections and a minor bruise could turn out to be a major health issue.

To address this concern, a team of scientists from IIT-Kharagpur has synthesised a low-cost gel from curd which not only retards the growth of antibiotic-resistant bacteria but also enhances wound healing. "From ancient times, curd has been used for skin and hair care. Drainage water from curd, which is usually discarded, contains a good amount of bioactive peptides which we have utilised for this therapeutic application," says Santi M Mandal, senior technical superintendent at Central Research Facility of IIT-Kharagpur and author of the study, while talking to India Science Wire.

For their study, scientists made curd by inoculating three strains of bacteria - *Streptococcus thermophilus*, *Lactobacillus casei*, and *Bifidobacterium bifidum*, which they obtained from National Collection of Dairy Cultures at Karnal-based National Dairy

Research Institute. They then collected the drainage water from the curd and purified it for bioactive peptides. They added ten micrograms of the peptide to 0.1 per cent trifluoroacetic acid and zinc nitrate to form a hydrogel. Scientists tested the efficacy of the hydrogel against two antibiotic-resistant strains. One of *Staphylococcus aureus* and another of *Pseudomonas aeruginosa*. The hydrogel killed both the strains. *Pseudomonas*, however, required a higher dose of hydrogel/peptide than *Staphylococcus*.

Often, a group of bacteria reside in a colony by synthesising mucilage around them called bio-film. These bio-films protect the bacteria from antibiotics. Biofilm formation is dependent on the ability of bacteria to move. Scientists found that hydrogel retarded movement of the bacteria and thus prevented bio-film formation.

To evaluate the wound healing activity of hydrogel, scientist used laboratory-grown skin cell lines. Scientists scratched the surface containing the skin cells and applied hydrogel over there. After 24 hours, cells were observed at the scratched surface. This confirmed that hydrogel can enhance the proliferation capacity of damaged cells and therefore has property of wound healing also.

"The cost of the hydrogel is very low and it is easy to prepare without the need of any harsh chemicals. It, therefore, has the potential to be used for therapeutic application in wound healing. We intend to test this hydrogel on small animals," added Mandal.

(Courtesy: India Science Wire The research team included Sounik Manna and Ananta K Ghosh, apart from Mandal. They have published the results of their work in journal *Frontiers in Microbiology*)

# Cancer causing bacteria strain gains antibiotic resistance, find scientists

*A study by the Kasturba Medical College and tertiary care hospital has found that Helicobacter pylori, a bacterium that causes stomach cancer, has gained so much resistance to two commonly used antibiotics that the drugs may not be able to provide any relief anymore*

By **BioVoice News Desk** - June 13, 2019



[By Dr Aditi Jain](#)

**New Delhi:** A new study has found that *Helicobacter pylori*, a bacterium that resides in the human stomach and causes ulcers, gastritis and stomach cancers, has gained so much resistance to two commonly used antibiotics – metronidazole and levofloxacin that the drugs may not be able to provide any relief anymore.

The relationship between humans and pathogens are quite dynamic. Whilst human survival depends on an ability to evade the pathogens, their survival depends on how well they can infect and thrive on humans. In this constant battle, pathogens keep modifying themselves to counteract the newer and newer drugs that humans develop to kill them. Over-use of antibiotics expedite this process leading to an increase in a number of antibiotic-resistant bacteria in the environment.

“The study was aimed to gain insights on the prevalence and mechanism of drug resistance in Helicobacter linked diseases so as to help develop strategies with more rational antibiotic combinations for treatment. This will also help implement precise therapy and thus prevent recurrence of the infections,” says Dr Mamatha Ballal, Professor at Kasturba Medical College based at Manipal, Karnataka and leader of the research team.

For their study, scientists collected tissue from 180 patients found positive for helicobacter infection while getting treatment at Kasturba Medical College and tertiary care hospital. The patient dataset comprised of people from nine districts of Karnataka. They were able to isolate helicobacter strains from 113 patients, which were then tested for their resistance against five routinely used antibiotics.

The results showed that 14% of strains were resistant to all the tested antibiotics and 59.3 percent of 59.3% of strains were found to be resistant to more than one antibiotic: 86% of this lot were resistant to both metronidazole and levofloxacin. This means that for all practical purposes metronidazole and levofloxacin are no more potent against helicobacter infections in Karnataka.

In terms of resistance to individual antibiotics, there was 81 percent resistance against metronidazole, 54.9 percent against levofloxacin, 20.4 percent against clarithromycin, 5.3 percent against tetracycline and 7.1 percent against amoxicillin.

“This study can act as a strong foundation to progress in national epidemiological surveillance which will be beneficial in evidence-based treatment and also as a managerial follow-up of eradication of Helicobacter if the first line treatment fails,” added Dr Ballal.

Asked about the future program, she said the group was planning to come out with a rapid kit for detection of drug resistance in Helicobacter, which would help clinicians modulate treatment regimen.

The research team included Vignesh Shetty, Ganesh C. Pai, Ramachandra Lingadakai, Girisha Balaraju and Shiran Shetty from Kasturba Medical College and Dr. Eng Guan Chua, BinitLamichhane and Chin Yen Tay of University of Western Australia. They have published a report on the work in the journal Gut Pathogens.

(India Science Wire)



## Better education links to good heart health

By -June 13, 2019



### Jyoti Singh

New Delhi, June 12 (India Science Wire): A new study has emphasized the role of better education than wealth in tackling cardiovascular diseases. The study explored the association between education and wealth, on the one hand, and cardiovascular diseases and mortality due to them, on the other, to assess which marker was the stronger predictor of outcomes and examined whether any difference in socioeconomic status influenced the levels of risk factors and how the diseases are managed.

“How much money you have tends to be a strong predictor of health outcomes, but education seems to be a far more robust measure to use across countries,” says Dr Scott Lear, Simon Fraser University, Canada.

In this cohort study, the researchers looked at 367 urban and 302 rural communities in 20 countries –India, Pakistan, Bangladesh, China, Canada, Sweden, Poland, Malaysia, Brazil, Chile, Argentina, Saudi Arabia, United Arab Emirates, Colombia, Iran, South Africa, Turkey, Tanzania, Zimbabwe, and occupied Palestinian territory. These countries include low-income, middle-income and high-income categories. They recruited adults aged between 35 and 70. They prepared two questionnaires to collect data on families and households and a third to get information on cardiovascular risk factors. Physical examinations supplemented the exercise.

Over a mean follow up duration of seven and a half years, there were 7,744 deaths due to cardiovascular diseases and 6,936 cases of major cardiovascular diseases. Mortality varied substantially by education and country income, with the highest mortality in low-

income countries and in those with the lowest levels of education, across country income categories. The group with lowest level of education in low-income countries had cardiovascular mortality five times that of people with the highest level of education in high-income countries.

The study has highlighted that education was an important factor as being educated it gives a person an ability to obtain effective care in several ways. The individual was able to seek timely help or information on how and where to obtain care and overcome the various barriers that exist both through formal channels and social networks. For instance, a person with lower level of education is more likely to live in a neighborhood with reduced access to health-care facilities.

“Education is actually what we consider as a modifiable factor, whereas wealth is not as modifiable. If we give people money they don’t suddenly become healthy, but if we strive to better educate our population, that will result in improved health because there is a more direct link between education and health outcomes,” Dr Lear says.

He noted that the study’s strength lay in its range and variability achieved from different geographical settings. “One of the unique aspects (of the study) is bringing together countries from different parts of the world that have a wide range of development. That allows us to look at factors that would vary to a greater extent than they would if we just looked exclusively at western countries”.

The study was led by Simon Fraser University, Canada and several institutions across the world were involved. The findings of the study have been published in journal *The Lancet: Global Health*.

## Scientists unravel the fungus responsible for Sheath Blight disease in rice

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Umashankar Mishra New Delhi | Published on June 13, 2019



A team of scientists at Delhi-based National Institute of Plant Genome Research has unraveled the genomic diversity associated with aggressiveness of two Indian strains of *Rhizoctonia solani*, the fungal pathogen that causes the dreaded Sheath Blight disease in rice.

The researchers have identified several genes and gene families in the strain that might account for their disease aggressiveness. This genomic insight is expected to help develop rice varieties resistant to sheath blight disease.

Sheath Blight disease is a major issue in rice cultivation. It can cause up to 60 per cent reduction in rice yield. It is difficult to breed disease resistant rice varieties, as there is

lack of natural source of disease resistance. Consequently, controlling the disease in a sustainable manner has remained a challenge.

Now, a solution could be in the offing following the new findings. The researchers, who have been working to characterise the Indian strains of the fungal pathogen for the past four to five years, decided to study the genome of two of the hyper aggressive strains. Their analysis revealed that there has been expansion and emergence of various genes and gene families in both these Indian strains. In the process, they have identified various pathogenicity associated genes and gene families that might account for their disease aggressiveness.

*Rhizoctonia solani* infected rice

Speaking to India Science Wire, leader of the team, Dr. Gopaljee Jha said, “Our team sequenced the genome of the two aggressive fungus strains called BRS11 and BRS13 and compared them with the already available genome of *Rhizoctonia solani* AG1-IA group. We have identified several Single Nucleotide Polymorphisms and insertion or deletion of bases in both these genomes”.

Asked about future plans, he said, “Further characterization of the identified genes will be helpful to understand their role in the pathogenesis of the fungus. The genetic manipulation of the pathogenicity-associated genes in rice through various biotechnological approaches may prove helpful in developing sheath blight resistant rice”.

In addition to Dr. Jha, the researchers included Srayan Ghosh, Neelofar Mirza, Poonam Kanwar and Kriti Tyagi. They have published a report on their study in research journal Functional and Integrative Genomics.

(India Science Wire)

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# दैनिक जागरण

## धान के पौधे में फफूंद रोग की आनुवांशिक विविधता का वैज्ञानिकों ने लगाया पता

नई दिल्ली, आइएसडब्ल्यू : भारतीय वैज्ञानिकों ने धान की फसल पर लगने वाले फफूंद रोग 'राइजोक्टोनिया सोलानी' की आक्रामकता से जुड़ी आनुवांशिक विविधता का पता लगाया है। नई दिल्ली स्थित राष्ट्रीय पादप जीनोम अनुसंधान संस्थान के वैज्ञानिकों ने एक ताजा अध्ययन में कई जीन्स की पहचान की है जो राइजोक्टोनिया सोलानी के उपभेदों में रोगजनक विविधता के लिए जिम्मेदार हो सकते हैं। शोधकर्ताओं का कहना है कि यह आनुवांशिक जानकारी शीथ ब्लाइट रोग प्रतिरोधी धान की किस्मों विकसित करने में मददगार हो सकती है।

इस शोध में राइजोक्टोनिया सोलानी के दो भारतीय रूपों बीआरएस11 और बीआरएस13 की आनुवांशिक संरचना का अध्ययन किया गया है और इनके जीन्स की तुलना एजी1-आईए समूह के राइजोक्टोनिया सोलानी फफूंद के जीनोम से की गई है। एजी1-आईए को पौधों के रोगजनक के रूप में जाना जाता है।

वैज्ञानिकों ने इन दोनों फफूंदों की आनुवांशिक संरचना में कई एकल-न्यूक्लियोटाइड बहुरूपताओं की पहचान की है तथा इनके जीनोम में सूक्ष्म खंडों के जुड़ने

शीथ ब्लाइट रोग प्रतिरोधी धान की नई किस्मों विकसित करने में मिलेगी मदद



राइजोक्टोनिया सोलानी फफूंद से संक्रमित धान

और टूटने का पता लगाया है। शोधकर्ताओं ने इन दोनों फफूंदों में विभिन्न जीन के उभरने और उनके विस्तार को दर्ज किया है, जिससे राइजोक्टोनिया सोलानी के भारतीय उपभेदों में तेजी से हो रहे क्रमिक विकास का पता चलता है। इस अध्ययन का नेतृत्व कर रहे नई दिल्ली स्थित राष्ट्रीय पादप जीनोम अनुसंधान संस्थान के वैज्ञानिक डॉ. गोपालजी झा ने बताया कि शीथ ब्लाइट के नियंत्रण के लिए प्राकृतिक स्रोतों के अभाव में इस रोग के खिलाफ प्रतिरोधक क्षमता रखने वाली चावल की

किस्मों का विकास कठिन है। हम चावल की फसल और राइजोक्टोनिया सोलानी फफूंद से जुड़ी आणविक जटिलताओं को समझना चाहते हैं ताकि शीथ ब्लाइट बीमारी के नियंत्रण की रणनीति विकसित की जा सके।

राइजोक्टोनिया सोलानी के कारण होने वाली शीथ ब्लाइट बीमारी धान उत्पादन से जुड़े प्रमुख खतरों में से एक है। इस फफूंद के अलग-अलग रूप विभिन्न कवक समूहों से संबंधित हैं जो चावल समेत अन्य फसलों को नुकसान पहुंचाने के लिए जाने जाते हैं। चावल की फसल में इस फफूंद को फैलने की अनुकूल परिस्थितियां मिल जाएं तो फसल उत्पादन 60 प्रतिशत तक गिर सकता है। शीथ ब्लाइट पर नियंत्रण का टिकाऊ तरीका न होना दीर्घकालिक चावल उत्पादन और खाद्यान्न सुरक्षा से जुड़ी प्रमुख चुनौती है। डॉ. झा ने बताया कि राइजोक्टोनिया सोलानी के जीन्स के अधिक अध्ययन से इस फफूंद की रोगजनक भूमिका को विस्तार से समझने में मदद मिल सकती है। इससे चावल में रोग पैदा करने से संबंधित जीन्स में आनुवांशिक जोड़-तोड़ करके शीथ ब्लाइट प्रतिरोधी धान की किस्मों विकसित करने में मदद मिल सकती है।

# DownToEarth

## Heat-tolerant bacteria that survived meteorite impact

The meteorite was made of a highly dense material and weighed 2.26 kilogrammes

By [Aditi Jain](#) Last Updated: Friday 14 June 2019



Microbes exist almost everywhere owing to their high adaptability. That's why scientists are on the look for those ones that can grow in harsh conditions. Such microbes could help them synthesise unique proteins and lipids which can have several applications.

On June 6, 2017, a meteorite landed on a sandy agriculture field at Mukundpur village in Rajasthan. A research team decided to seize the opportunity to isolate and study the bacteria at the impact site as they would have withstood the high pressure and temperature generated by meteorite impact.

The meteorite was made of a highly dense material (2300kilogram/cubic meter) and weighed 2.26 kilogram. It was traveling at an estimated velocity of about 11 to 30 kilometer per second. On hitting the ground, it created a circular pit of 43 centimeter in diameter and 15 centimeter in depth.

A research team from Pune-based Modern College of Arts, Science and Commerce collected soil and rock samples from the place of impact, together with samples from nearby areas not impacted by the meteorite, within 48 hours of the event.

In the laboratory, the soil samples were added with a nutrient-rich medium first at ambient temperature and later at a temperature of 55 degreesCelsius. Once the bacteria grew in adequate numbers, their DNA was extracted and sequenced for a small piece of gene 16S rRNA. This helped researchers identify the bacteria, using the information from online databases of microbes.

Further analysis revealed that two bacteria, *Bacillus thermocopriae* IR-1 and *Brevibacillus borstenlensis* were more prominent in samples from the impacted area as compared to those from non-impacted areas.

*Bacillusthermocopriae* IR-1 was studied more closely and it was found that it was able to grow at a temperature of upto 60 degrees and 10 per cent salt solution. It could also survive meteorite impact like situation simulated in the laboratory.

“No reports are available on the effect of a meteorite impact on microbial diversity in fresh fall sites. Identification of microbes that can survive under such pressures could help in study of the effects of space-related stress and interplanetary travel,” explained Rebecca S Thombre, who led the research team from the Modern College of Arts, Science and Commerce while speaking to *India Science Wire*.

Besides Thombre, the team included PP Kulkarni, E Shivakarthishik, T Pataskar, BS Patil (Modern College of Arts, Science and Commerce, Pune); Bhalamurugan Sivaraman, JK

Meka, and S Vijayan (Physical Research Laboratory, Ahmedabad); Parag A Vaishampayan and Arman Seuylemezian (California Institute of Technology, USA).

The study findings have been published in journal *Astrobiology*. The study was funded by ISRO-Space Technology Cell, Pune.

**(India Science Wire)**



*By P Surat*

Chennai, June 14: India is in the grip of severe heat wave with several places across the country recording temperatures more than 45 degree Celsius. Severe heat can also impact growth of agricultural crops. Heat stress experienced during reproductive stages of plants can adversely impact development and function of reproductive compartments, flowers, pods, and thus severely affect the yield.

In a new study, researchers have found that the reproductive functions of mung bean plants were reduced upon heat stress and that this damage could be reversed by application of GABA, a naturally occurring amino acid, to roots and leaves.

Mung bean is grown as a summer crop between rice-wheat sequence. It has a short duration (about 70 days), and faces high temperatures up to 45 degree during its flowering and podding stage, causing serious damage to flowers and pods in terms of number and size.

*“Currently, there are no heat-tolerant varieties of mung bean. So we decided to investigate the heat tolerance in mung bean plants,” said Harsh Nayyar, scientist at Punjab University and a member of the research team.*

Gamma-aminobutyric acid or GABA is a non-protein amino acid known to regulate carbon metabolism, maintain pH and osmotic pressure inside cells, and protect cells from various stresses. In Arabidopsis plants, it is known to accumulate in conditions of high heat. That's why researchers wanted to see if it was involved in how mungbean plants respond to heat and if it had heat-protective properties.

It was found that heat stress had a severe impact on mung bean plant. Heat stress reduced GABA levels within the plant by 50% and 60% in leaves and anthers. This lowering of GABA levels was accompanied by reduced water content in leaves, reduced viability of pollens, germination, and photosynthetic abilities of mungbean plant.

To study the protective role of GABA, the researchers externally supplemented GABA in heat-stressed plants that had reduced levels of this amino acid. This was done by drenching the roots in varying concentrations of GABA and by spraying it directly on to the leaves. Such application increased the GABA levels in leaves and anthers (pollen-producing part of the flower) and also substantially improved the pollen viability and germination, pod numbers, and seed yield.

Further analysis revealed that heat stress also negatively affected the photosynthetic activity, assimilation of carbon dioxide from the environment, and water content in leaves. Externally supplementing GABA could rescue the impact on all these factors and also reduce the oxidative damage incurred due to the heat. Based on these observations, researchers concluded that GABA could protect reproductive function in mung bean plants under heat stress as a result of improved water content, carbon fixation and assimilation.

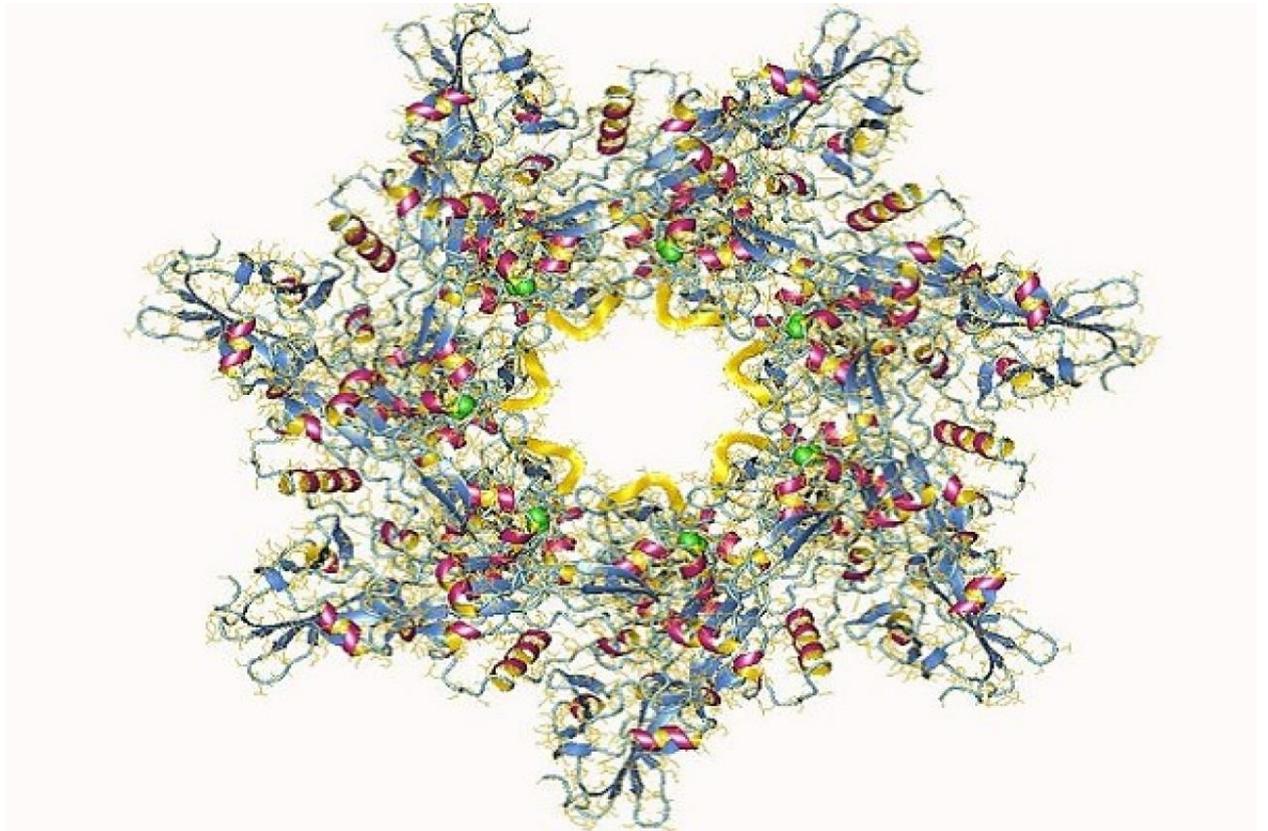
However, researcher said these are preliminary experiments conducted in a controlled environment. More tests need to be performed before GABA can be taken from lab to the fields. The team is also planning to extend this method to other crop varieties to study if different crops respond in a similar manner.

The research team included Manu Priya, Lomeshwar Sharma, Ramanpreet Kaur, Harsha Nayyar (Punjab University, Chandigarh); H. Bindumadhava, Ramkrishnan M. Nair (ICRISAT, Hyderabad); K. H. M. Siddique (University of Western Australia, Australia). The results have been published in journal *Scientific Reports*.

[\(India Science Wire\)](#)

## Indian Scientists Develop Superior Anthrax Vaccine To Provide Complete Protection Against Deadly Disease

by Swarajya Staff - Jun 18 2019, 3:51 pm,



A group of researchers from the Defence Research and Development Laboratory (DRDL), Mysore and Jawaharlal Nehru University (JNU), Delhi have developed a new Vaccine against Anthrax, [reports India Science Wire](#).

Unlike the existing vaccines that generate immune response to the anthrax toxin alone, the new vaccine can do so against the anthrax toxin as well as its spores.

Anthrax is a deadly human disease caused by bacterium *Bacillus anthracis* that also infects animals like horses, sheep, cattle and goats. The spores of the bacterium can stay latent in the soil for years. However, under favourable environmental conditions, they become active and start to infect. Once they enter the body of a host, the spores germinate and start producing toxins.

The existing anti-anthrax vaccines generate response against a Bacillus protein-protective antigen - a protein that helps in transport of bacillus toxins inside the cells, which means that immune response is triggered only when spores germinate in the body and start producing bacterial proteins.

The group of Indian scientists decided to develop a vaccine which is effective against both the toxin and its spores. To achieve this, they stitched together portions of two genes - protective antigen protein and protein present in the outer layer of the spore. The fusion of the two proteins was then injected into mice.

A few days later, the scientists found that injected mice had high concentration of antibodies against fused proteins in its blood, demonstrating immune response against the injected protein.

They also found that the antibodies were also able to individually bind both spore and protective antigen protein, showing that the vaccine can generate immune response against both spores and the toxin.

The vaccines for anthrax are necessary as its infection can cause death within two to three days leaving no scope for diagnosis and treatment.

## Tezpur University Invents Nano-Ink That Can Help Combat Counterfeiting!



This invisible nano-ink may help combat counterfeiting!

Duplicating or counterfeiting of products is a major problem globally. Standard measures like printing barcodes or holograms used to prevent duplicating of products are usually not foolproof as they too can be forged.

Nanotechnology may offer hope to address this menace. It relies on certain methods based on natural physical or optical changes that occur in nanoparticles when subjected to specific conditions. These changes can be easily identified, but the technology is difficult to duplicate.

Researchers at the Advanced Polymer and Nanomaterial Laboratory (APNL) of Tezpur University have developed a novel, light-emitting nanocomposite-based ink that is barely

detectable under visible light but glows when kept under ultraviolet light. The ink has shown potential to be used as an anti-counterfeiting material on paper and plastic.

The nanocomposite has an intricate structure to prevent imitation. By dispersing it in organic solvents like xylene, it turns into an ink that can be used directly to write or mark a label. The liquid appears pale-yellow under visible light, and glows with a cyan (blue-green) tint when exposed to UV light of specific wavelength, explained Dr Niranjana Karak, Group Leader of APNL, while speaking to India Science Wire.

The composite was fabricated by incorporating nanodots into special polyurethane (PU) polymer. The polymer was derived from bio-waste of vegetable oils and petrochemicals to make it eco-friendly. By using a pre-polymerisation technique, the architecture of the polymer matrix was modified to yield a special hyperbranched Polyurethane (HPU).

The enhanced HPU was then reinforced by nanoparticles of graphitic carbon nitride - a photoluminescent material. The nanodots -also known as quantum dots - are of zero-dimension, which means the particles are just a few nanometers in size.

The resulting composite had improved physical and mechanical properties contributed by the graphene-like property of the nanodots while retaining its photoluminescence quality under UV radiation of 365 nanometer wavelength.

The composite was then dispersed in organic solvents to obtain the ink, which was smeared on paper and plastic. The stress-strain tests revealed that the ink improved the overall toughness of the coated materials manifold. Moreover, the ink was water resistant and stable under ambient conditions for several months, indicating its potential use as an anti-counterfeiting material.

The performance of the ink was demonstrated by writing a few letters on paper and plastic. It was observed that the lettering was not visible in daylight, whereas when kept under UV light, it glowed with a cyan hue.

For easy use, the ink can be loaded into the refill of a sketch or gel pen and has a shelf life of up to ten years and degrades in a few months only under the action of soil microbes, points out the scientist.

We are exploring further to test the ink under other light sources. More comprehensive studies will be done to check the performance for all weather conditions, he added.

Niranjana Karak and Rajarshi Bayan are from the Advanced Polymer and Nanomaterial Laboratory, Tezpur University. They authored the paper and the results have been published in the journal ACS Omega.

Featured Image Source: Pixabay

Article Courtesy: India Science Wire

# TECH2

## IIT RESEARCHERS DEVELOP METHOD TO ENHANCE THE EFFICIENCY OF EXISTING SOLAR CELLS

The third generation of dye-sensitized solar cells are environmentally friendly and not too expensive.

INDIA SCIENCE WIRE JUN 19, 2019 10:25:43 IST

Researchers at the Indian Institute of Technology Hyderabad have developed a new process that promises to improve the performance of Dye-Sensitized Solar Cells (DSSC). Dye-sensitized solar cells hold a lot of promise because of the possible cost and environmental benefits. But they have low light-to-power conversion efficiency. The new process promises to enhance efficiency.

The first-generation silicon-based cells with energy harvesting efficiency of about 26 percent continue to be costly. Second-generation thin film solar cells based on semiconductors like cadmium-telluride and cadmium-selenide have comparable efficiencies, and not much lower cost. The third generation of dye-sensitized solar cells can significantly lower the costs of solar cells while being environment-friendly.



But, their efficiencies need improvement to translate to practical products. Researchers initially tried introducing holmium oxide, a powerful paramagnetic material, into the

anode of the cell and by applying external magnetic fields. The experiment showed an enhancement in efficiency.

However, the application of an external magnetic field can be power-consuming because electromagnets themselves require energy for their functioning. The team consequently replaced holmium oxide with iron oxide magnetic nanoparticles since it produced a magnetic field internally. The result was as good.

“A dye molecule absorbs the light energy in DSSC and causes electrons in the dye to jump to titania and then to the external circuit, which causes a flow of electrons, leading to a current,” explained Dr Jammalamadaka Suryanarayana, who led the research team. Dr Suryanarayana conducted the study with his student U.M. Kannan and Dr L. Giribabu, senior scientist, Indian Institute of Chemical Technology, Hyderabad. The team has published a report on their work in the journal *Solar Energy*.

## चिंताजनक

एंबिओ जर्नल में प्रकाशित हुए अध्ययन के अनुसार, भारत में कई मछुआरे और व्यापारी शार्क संरक्षण के नियमों से अनजान हैं, इसके लिए जागरूक किए जाने की जरूरत है

## भारत में गिर रही है शार्क मछलियों की संख्या

वासको-द-गामा (गोवा), आइएसडब्ल्यू : भारत दुनिया का दूसरा सबसे बड़ा शार्क मछली पालने वाला देश माना जाता है लेकिन मछुआरे और मछली व्यापारी शार्क संरक्षण के नियमों से अनजान हैं। इसके कारण पिछले कई वर्षों से यहाँ शार्क मछलियों की संख्या लगातार कम हो रही है। एंबिओ जर्नल में प्रकाशित अध्ययन के मुताबिक, भारतीय मछुआरे प्रायः बड़ी शार्क मछलियां नहीं पकड़ते हैं, बल्कि दूसरी मछलियों को पकड़ने के लिए छाले गए जाल में बड़ी शार्क भी फंस जाती हैं। ज्यादातर मछुआरे और व्यापारी जानते हैं कि ब्लैक शार्क को पकड़ना गैर-कानूनी है। लेकिन वे शार्क की अन्य प्रजातियों जैसे- टाइगर, हेमरहेड, बुकशार्क, पिगी शार्क आदि के लिए निर्धारित राष्ट्रीय शार्क संरक्षण मानकों से अनजान हैं।

शार्क मछलियों को उनके मांस और पंखों के लिए पकड़ा जाता है। इनके पंखों के अंतरराष्ट्रीय बाजार की स्थिति काफी हद तक अनियमित है। भारत में शार्क के मांस के लिए एक बड़ा घरेलू बाजार है। जबकि निर्यात बाजार छोटा है। यहाँ छोटे आकार और किशोर शार्क के मांस की मांग सबसे ज्यादा है। आमतौर पर एक मीटर से छोटी शार्क मछलियाँ ही पकड़ी जाती हैं और छोटी शार्क स्थानीय बाजारों में महँगी विक्रती हैं। शार्क संरक्षण को लेकर किए



दुनिया में 4000 प्रजाति की शार्क पाई जाती हैं। फाइल

गए एक अध्ययन में ये बातें सामने आई हैं। अशोका यूनिवर्सिटी, हरियाणा, जेम्स कुक यूनिवर्सिटी, ऑस्ट्रेलिया और एलेस्मो प्रोजेक्ट, संयुक्त अरब अमीरात के वैज्ञानिकों द्वारा किए गए इस अध्ययन में शार्क व्यापार के दो प्रमुख केंद्रों गुजरात के पोरबंदर और महाराष्ट्र के मालवन में सर्वेक्षण किया गया है। भारत में शार्क मछलियाँ पकड़ने में गुजरात और महाराष्ट्र का कुल 54 प्रतिशत योगदान है। शार्क मछलियाँ पकड़ने के लिए पोरबंदर में 65 प्रतिशत ट्राल नेटों और मालवन में 90 प्रतिशत गिलनेटों सहित हुक एंड लाइन मत्स्य पालन विधि का उपयोग होता है। अध्ययन से जुड़ी अशोका यूनिवर्सिटी की शोधकर्ता डॉ. दिव्या कर्नाड ने बताया कि बड़ी शार्क मछलियों की संख्या में लगातार गिरावट की जानकारी ज्यादातर मछुआरों और व्यापारियों को दे और व्यापारी स्थानीय नियमों का पालन भी करते हैं। लेकिन, भारत में शार्क

मछलियों की संख्या में गिरावट के सही मूल्यांकन के लिए बड़े पैमाने पर शोध करने होंगे।

**शार्क के बाजार में गिरावट :** शोधकर्ताओं के अनुसार, पिछले दस सालों में शार्क पंखों की अंतरराष्ट्रीय विक्री में 95 प्रतिशत तक गिरावट हुई है। उत्तर-पश्चिमी भारत में शार्क मछलियों की संख्या और आकार में लगातार गिरावट का आर्थिक असर मछुआरों और व्यापारियों पर पड़ रहा है। अध्ययन के आंकड़े स्थानीय मछुआरों, नौका मालिकों, खुदरा विक्रेताओं और मछली व्यापारियों से साक्षात्कार के आधार पर एकत्रित किए गए।

**पंखों का होता है विदेश में व्यापार :** अध्ययन से पता चला है कि मछली पकड़ना भारतीय मछुआरों का प्राथमिक व्यवसाय है और शार्क व्यापार सिर्फ अतिरिक्त आमदनी का जरिया है। व्यापारी पूरी शार्क एक जगह से ही खरीदते हैं। लेकिन, उसके पंख और मांस अलग-अलग बेचते हैं। शार्क के पंख मालवन से मडगांव और मंगलूरु जैसे दो प्रमुख मछली व्यापार केंद्रों से होते हुए अंततः चीन और जापान में भेजे जाते हैं। इसी तरह, पोरबंदर से ओखा, वैरावल, मुम्बई, कालीकट और कोच्चि से होते हुए सिंगापुर, हांगकांग और दुबई व आबूधावी तक शार्क के पंख भेजे जाते हैं।

# This gelatin-based tissue patch could help heal wounds faster

Susheela Srinivas Bengaluru | Published on June 19, 2019



The gel patch enables fast migration of repair cells along with providing antibacterial property

Bioactive adhesive tissue patches are emerging as an alternative to suturing for deep cuts and wounds.

A team of researchers from the Indian Institute of Technology (IIT) - Bombay have now found that gelatin-based patches loaded with silver nanoparticles perform better than collagen ones. The preliminary results have shown its potential to accelerate wound healing, minimise cell toxicity and support cell viability. The gel patch enables fast migration of repair cells along with providing antibacterial property.

Instead of collagen, the researchers used gelatin — a derivative of collagen. With a suitable chemical modification, transformed the gelatin into a gel form. Silver nanoparticles were then incorporated into the gel as an antibacterial agent. “This gel was found to be more efficient in mediating wound healing compared to pure collagen gels,” explained Professor Shamik Sen, who was involved in the study.

The researchers used readily available methacrylate gelatin known as GelMA, which has better mechanical properties than pure gelatin. A precursor solution was prepared by combining it with and a photo-initiating agent. This solution, when applied on the wound surface, fills up the wound area. Upon brief exposure to ultraviolet light, the solution polymerises to form a gel or adhesive.

Cell viability tests were performed by culturing fibroblasts (cells involved in tissue healing) on the gel and tested with a phase-contrast microscope. The results indicated that the gel is conducive for fibroblast motility and growth.

The team then incorporated silver nanoparticles into the gel to take advantage of silver’s antibacterial properties. Further tests for the scratch wound assay, using a polydimethylsiloxane (PDMS) device, showed that the gel could heal wounds by triggering migration of cells into the wound region and proliferate there.

Researchers now hope to test the efficacy of the gel in animals. Their objective is to develop a relatively inexpensive adhesive patch which can be used to heal burn wounds and to treat ulcers in diabetic patients.

The research team at IIT-B included Iffat Jahan, Edna George and Shamik Sen from the Department of Biosciences and Bioengineering; and Neha Saxena from the Department of Chemical Engineering. The study results have been published in the journal ACS Applied Bio Materials.

*(Sourced from India Science Wire)*

# DownToEarth

## Photographic identities may help in elephant census: Study

Researchers used the technique to estimate Asian elephant populations in the Kaziranga National Park in Assam

By [Monika Kundu Srivastava](#) Last Updated: Wednesday 19 June 2019



Elephants worldwide are threatened by deforestation and poaching for ivory. Reliable monitoring of their populations is a key priority for conservation policy and action. A new study done in Northeast India has shown that taking a series of photographs of elephants may be a good technique for determining actual number of elephants in an area.

Researchers from Wildlife Conservation Society India and the Forest Department, Assam, used systematically documented photographic identities of individual elephants to estimate Asian elephant populations in the Kaziranga National Park in Assam.

Based on their characteristic body features such as shape of the ear lobe, tusk orientation and tail length among others, each elephant was assigned a unique ID upon ensuring that it was different from all other individuals in the database. This ID was then attached to all subsequent recaptures of the same elephant.

The elephants were divided into adult males and herd-adults (comprising adult females and sub-adults), Based on social structure. The researchers photographed 890 elephant sightings, out of which 720 sightings yielded usable photographs for individual identification.

Of them, the number of unique elephants comprised 210 adult females, 23 sub-adult females, 88 adult males and 28 sub-adult males. Out of the 88 adult males, there were 48 tuskers and 40 without tusks.

“Our study pioneers the use of photographic spatial capture–recapture to estimate all segments of an Asian elephant population, including the largely solitary adult males and the herd-living adult females and younger elephants,” explained Varun R. Goswami, who led the research team.

It emerged that adult males travelled less than the other elephants during the survey period in the flood-plain ecosystem of the Park. Periodic flooding of the Brahmaputra River that forms the northern boundary of Kaziranga forces wildlife to move between the park and habitats to its south.

Based on elephant movement, the study estimated that a total of 908 herd-adults, 228 adult males and 610 juvenile and young comprise the population of elephants found both within Kaziranga National Park, as well as adjoining habitats.

“Conservation strategies for Kaziranga National Park must consider the larger landscape of which it is a part,” said Divya Vasudev, a member of the team.

The research team included Varun R Goswami, Mahendra K Yadava, Divya Vasudev, Parvathi

K Prasad, Pragyan Sharma and Devcharan Jathanna. The findings have been published in journal *Scientific Reports*.

**(India Science Wire)**

## मस्तिष्क के ट्यूमर की पहचान में मददगार हो सकते हैं नए जैव संकेतक

जून 19, 2019



नई दिल्ली, 19 जून (इंडिया साइंस वायर): ग्लायोमा (Glioma) मस्तिष्क में होने वाला एक प्रकार का घातक ट्यूमर (Malignant tumor in the brain) है जो जानलेवा हो सकता है। एक ताजा अध्ययन में भारतीय शोधकर्ताओं ने ग्लायोमा की वृद्धि से जुड़े जैव संकेतकों (Bioinformatics associated with the growth of Glioma) का पता लगाया है जो इसकी पहचान और उपचार में मददगार हो सकते हैं।

**भारतीय प्रौद्योगिकी संस्थान, जोधपुर (Indian Institute of Technology, Jodhpur)** और टाटा मेमोरियल अस्पताल, मुंबई के शोधकर्ताओं द्वारा संयुक्त रूप से किए गए शोध में एनएलआर समूह के जीन्स और उनसे संबंधित प्रतिरक्षा संकेतों की कार्यप्रणाली का अध्ययन किया गया है और **जैव संकेतक प्रोटीन एनएलआरपी12 (NLRP12)** की पहचान की गई है। यह प्रोटीन प्रतिरक्षा संबंधी प्रतिक्रिया में अपनी भूमिका के लिए जाना जाता है।

शोधकर्ताओं का कहना है कि तंत्रिका तंत्र में न्यूरॉन की सहायक ग्लियल कोशिका माइक्रोग्लिया में एनएलआरपी12 प्रोटीन की कमी से कोशिकाओं में असामान्य वृद्धि हो सकती है। जबकि, अध्ययन में एनएलआरपी12 की कमी वाली ग्लायोमा ट्यूमर कोशिकाओं का प्रसार कम देखा गया है।

**ग्लियल कोशिकाएं तंत्रिका तंत्र में संतुलन बनाए रखने के साथ-साथ मरम्मत में भी अपनी भूमिका निभाती हैं और इन कोशिकाओं में ही ग्लायोमा ट्यूमर बनता है।** सर्जरी, कीमोथेरेपी और रेडियोग्राफी के बावजूद ग्लायोमा से पीड़ित मरीजों के जीवित बचने की दर कम होती है।

भारतीय प्रौद्योगिकी संस्थान, जोधपुर की प्रमुख शोधकर्ता डॉ सुष्मिता झा ने इंडिया साइंस वायर को बताया कि

*“कैंसर जीनोम एटलस से ग्लायोमा ग्रस्त रोगियों के आंकड़ों प्राप्त किए गए हैं। इन आंकड़ों के उपयोग से एनएलआर समूह के जीन्स, कोशिका प्रसार के संकेतकों, डीएनए मरम्मत, ट्यूमर रोकथाम और ग्लायोमा पैथोलॉजी से जुड़े अन्य महत्वपूर्ण कड़ियों को जोड़कर उनका अध्ययन किया गया है। यह नेटवर्क उन जीन्स के बारे में जानकारी देता है जो ग्लायोमा में रूपांतरित हो जाते हैं।”*

*“एटलस के आंकड़े ट्यूमर ऊतकों से प्राप्त होते हैं, जिसमें ग्लायोमा कोशिकाओं, एंडोथेलियल कोशिकाओं (रक्त वाहिकाओं की परत बनाने वाली कोशिकाएं) और ट्यूमर से जुड़े माइक्रोग्लिया/मैक्रोफेज (ट्यूमर के भीतर प्रतिरक्षा कोशिकाएं) सहित कई प्रकार की कोशिकाएं शामिल हैं। इसीलिए, अध्ययन में सामान्य कोशिकाओं और मस्तिष्क ट्यूमर कोशिकाओं में विशिष्ट अंतरों की पहचान के लिए कोशिका संवर्धन किया गया है। मस्तिष्क के ऊतकों से प्राप्त प्रयोगात्मक आंकड़ों के उपयोग से इन ऊतकों में नए जैव संकेतकों की मौजूदगी की पुष्टि की गई है।”*

मस्तिष्क को संकेत भेजने वाली प्रोटीन से बनी रासायनिक संरचनाएं जिन्हें रिसेप्टर्स कहते हैं, प्रतिरक्षा कोशिकाओं द्वारा व्यक्त संदेशों को प्राप्त एवं रूपांतरित करने के लिए जानी जाती हैं। एनएलआर समूह के रिसेप्टर्स प्रतिरक्षा तंत्र से जुड़े प्रमुख नियामक होते हैं। एनएलआर रिसेप्टर्स को कई कैंसर रूपों के लिए जिम्मेदार माना जाता है। हालांकि, ग्लायोमा में एनएलआर की भूमिका के बारे में जानाकारी सीमित है। वैज्ञानिकों के अनुसार, कैंसर के मामले में एनएलआर की भूमिका को समझने से चिकित्सीय रणनीति और दवाओं के विकास में मदद मिल सकती है।

विज्ञान एवं प्रौद्योगिकी विभाग और जैव प्रौद्योगिकी विभाग द्वारा अनुदान प्राप्त यह अध्ययन शोध पत्रिका साइंटिफिक रिपोर्ट्स में प्रकाशित किया गया है। शोधकर्ताओं में डॉ सुष्मिता झा के अलावा निधि शर्मा, शिवांजलि सक्सेना, ईशान अग्रवाल, शालिनी सिंह, वर्षा श्रीनिवासन, एस. अरविंद, सुष्मिता पॉल और श्रीधर एपारी शामिल थे।

## Developed, urbanized districts have high HIV prevalence

By Dr. Aditi Jain      22-06-2019



**W**ith over two million HIV infected individuals, India is home to one-third of the world's HIV population. Although the national level data shows a downward trend, the decline is not uniform across states and districts.

A new study has found that underlying factors for the epidemic also vary from region to region, and region-specific strategies may be necessary for HIV control.

There is high prevalence of HIV in 63 districts in South and North-east regions of the country, the study has found. Of them, "better developed, urbanised districts with large population size, better socio-economic status of population are more likely to have consistently high HIV prevalence levels." While planning HIV control strategies, the focus should be on districts which are showing signs of rapid urbanisation and socio-economic development, the study has suggested.

The factors responsible for the epidemic are complex and can be contrasting for different regions, restricting the use of a single approach for HIV control nationally. Therefore, continuous monitoring for prevalence and causes of disease at the district level is necessary for making control programs more effective.

Researchers used data from 2011 Census, HIV Sentinel Surveillance programme and District Level Household Survey-III and analysed trends from 2007 to 2012 in 640 districts. They correlated HIV prevalence with fourteen factors broadly belonging to categories - population profile; socio-economic factors; HIV and sexually transmitted infections, awareness and condom usage.

The analysis revealed that districts with high literacy, better socio-economic status, and higher proportion of population in reproductive age group and late marriages had consistently high HIV prevalence in all the regions except in southern states.

Elaborating on this trend, researchers explained that often young educated individuals move to urban areas for better opportunities and are separated from family. With better income, they are ready to explore and often have sexual encounters with multiple partners before they get married. This increases chances of HIV. Researchers believe that since south India was first to face HIV upsurge, the HIV epidemic has evolved over time in these states, therefore not affected by factors like better socio-economic indicators like in other states.

"Our study has highlighted inter-regional variations in factors responsible for HIV prevalence. While implementing common strategies for prevention and control of HIV/AIDS at the national level, additional regional approaches may also be necessary," explained Dr Rajneesh Joshi, who conducted the study at Pune-based ICMR-National AIDS Research Institute while on a study leave from the Indian army where he is working as a public health specialist.

The study also found that higher knowledge levels about the role of condom use for HIV prevention as well as the use of condoms correlates with reduced HIV cases in districts.

However, high literacy and awareness about HIV/AIDS alone does not mean better low HIV prevalence, supplementing this knowledge with HIV prevention methods can only reduce the cases of HIV.

"Results of this study have been communicated to the National AIDS Control Organisation (NACO). We will continue our analysis to track the scenario following the introduction of test and treat policy by the program," informed Dr Joshi while speaking to India Science Wire.

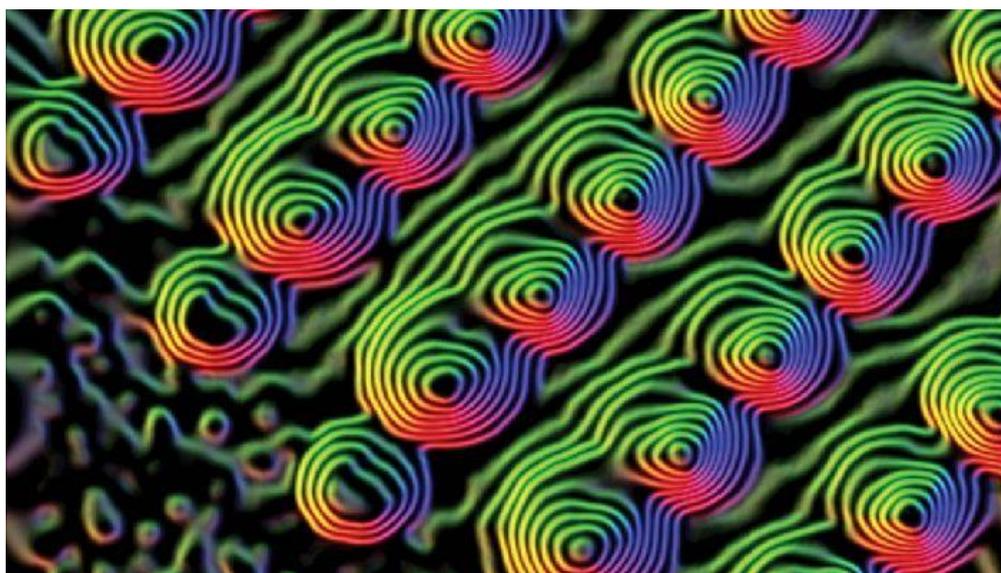
The study, among other things, has highlighted that the districts which are rapidly progressing towards urbanization and socio-economic development may see an increase in the number of HIV cases. The study further advocates the need to raise awareness of HIV prevention and use of condoms along with HIV in general.

The research team included Dr Sanjay M. Mehendale of Indian Council of Medical Research, New Delhi apart from Dr Rajneesh. The research published in the journal Plos One.

(India Science Wire)



## **Cleaning Toxic Effluents By Using Clay & Tea Waste Based Membrane**



JUNE 21, 2019

Scientists at CSIR- North East Institute of Science and Technology, Jorhat, have developed a ceramic membrane with the help of a mixture of potter's clay, stone dust and tea waste.

They have tested the membrane on effluents from a textile unit and found that it could remove absorptive dyes from wastewater.



Ceramic filters and membranes are commonly used in several sectors like food and beverage, drug and chemicals, waste recovery and recycling industries.

Ceramic membranes can withstand frequent cleaning, harsh operating environments and situations that require continuous flows of material.

The newly developed membrane has good thermal and chemical stabilities. It is capable of discolouring two commonly used dyes — methylene blue and Congo red — from water.

Methylene blue is a toxic dye, while Congo red is a known cancer-causing agent.

The used membrane could also be regenerated by heating at 400 degrees for 30 minutes, without much loss of efficiency.

Potter's clay from Dhekial region of Golaghat district in Assam formed the base material providing plasticity, stone dust was used as a reinforcement material and tea waste provided porosity to the membrane.

The aim was to use waste materials from neighborhood so as to reduce costs and at the same time ensure an efficient output.

अध्ययन

हवा में मौजूद सूक्ष्म कणों के साथ ओजोन की जुगलबंदी स्वास्थ्य के लिए बेहद खतरनाक सिद्ध हो सकती है...

गर्मी में वायुमंडल में बढ़ रहा ओजोन प्रदूषण

नई दिल्ली, आइएसडब्ल्यू : हवा में ओजोन का उच्च स्तर स्वास्थ्य के लिए हानिकारक हो सकता है। इस वर्ष अप्रैल से जून के बीच गर्मी के महीनों में जब पारा लगातार बढ़ रहा है तो राष्ट्रीय राजधानी क्षेत्र में ओजोन का स्तर भी पिछले वर्ष की तुलना में निर्धारित मात्रा से अधिक पाया गया है। वैज्ञानिकों का कहना है कि हवा में मौजूद सूक्ष्म कणों के साथ ओजोन की जुगलबंदी स्वास्थ्य के लिए अधिक खतरनाक हो सकती है।

इस साल 1 अप्रैल से 15 जून के बीच ऐसे दिनों की संख्या ज्यादा रही है जब ओजोन का स्तर निर्धारित मानकों से अधिक दर्ज किया गया है। पिछले साल इस अवधि में पांच प्रतिशत दिन ऐसे थे जब ओजोन की मात्रा निर्धारित मानकों से अधिक पाई गई थी जो इस साल बढ़कर 16 प्रतिशत हो गई है। इस वर्ष 28 दिन ऐसे रहे हैं जब ओजोन का स्तर अधिक दर्ज किया गया है। यह आंकड़ा पिछले वर्ष 17 दिनों का था। सेंटर फॉर साइंस एंड इंवायरमेंट (सीएसई) के शोधकर्ता केंद्रीय प्रदूषण नियंत्रण बोर्ड के निगरानी केंद्रों से प्राप्त वर्ष 2018 और 2019 के आंकड़ों के विश्लेषण के आधार पर इस निष्कर्ष पर पहुंचे हैं।

अत्यधिक सक्रिय गैस है ओजोन :

इस वर्ष अब तक ओजोन का घनत्व 122 माइक्रोग्राम प्रति घनमीटर किया गया दर्ज

सेंटर फॉर साइंस एंड इंवायरमेंट के शोधकर्ता ने किया अध्ययन



ओजोन का बढ़ना स्वास्थ्य के लिए हानिकारक है।

सीएसई की कार्यकारी निदेशक अनुमिता रॉय चौधरी ने बताया कि ओजोन अत्यधिक सक्रिय गैस है जिसका सांस की बीमारियों से ग्रस्त लोगों के स्वास्थ्य पर बुरा असर पड़ सकता है। गर्मी में ओजोन स्तर का मूल्यांकन खास कारणों से किया गया है क्योंकि ओजोन किसी स्रोत से सीधे उत्सर्जित नहीं होती, बल्कि यह गैस वाहनों, उद्योगों या बिजली संयंत्रों

से उत्सर्जित नाइट्रोजन ऑक्साइड और वाष्पशील कार्बनिक यौगिकों के हवा में सूर्य के प्रकाश और तापमान के संपर्क में आने से बनती है।

गाजियाबाद और गुरुग्राम में मिला उच्च स्तर : कई आवासीय और औद्योगिक क्षेत्रों में ओजोन की निर्धारित सीमा पार करने वाले दिनों की संख्या बहुत अधिक (53 से 92 प्रतिशत) दर्ज की गई है। राष्ट्रीय राजधानी क्षेत्र में शामिल गाजियाबाद, गुरुग्राम और फरीदाबाद में भी ओजोन का उच्च स्तर पाया गया है। फरीदाबाद में सर्वाधिक 80 प्रतिशत दिनों में ओजोन का स्तर सामान्य से अधिक दर्ज किया गया है। गाजियाबाद में 67 प्रतिशत और गुरुग्राम में 21 प्रतिशत गर्मी के दिनों में ओजोन का स्तर अधिक दर्ज किया गया है।

ओजोन जोखिम का औसत मानक आठ घंटे में 100 माइक्रोग्राम प्रति घनमीटर होता है। इस वर्ष अब तक गर्मी के मौसम में ओजोन का घनत्व 122 माइक्रोग्राम प्रति घनमीटर दर्ज किया गया है जो निर्धारित मापदंड से 1.22 गुना अधिक है। पिछले वर्ष समान अवधि में यह आंकड़ा 106 माइक्रोग्राम प्रति घनमीटर दर्ज किया गया था। शोधकर्ताओं के अनुसार यह स्थिति चिंताजनक है। हमें समय रहते इसके लिए कदम उठाने होंगे।

## A medicated nail enamel to help fight infection

Susheela Srinivas Hans News Service 22 Jun 2019 3:33 AM



A fungus, *Trichophyton rubrum*, causes painful infection of toe and fingernails. Prevalent in coastal regions and wet work zones, the infection known as Onychomycosis accounts for about half of all nail diseases. It causes brittleness, discoloration and disfigurement of nails.

The disease needs prolonged treatment with both oral medication and application of ointments, which are both expensive and have side effects. Researchers from the Delhi-based Hamdard Institute of Medical Sciences and Research have now developed a novel translucent nail lacquer fortified with an antifungal drug to treat onychomycosis. The drug-infused, quick-drying polymer can be easily applied like nail polish.

This nail lacquer has shown promising results in delivering the antifungal drug for extended durations indicating its potential use as a topical application and effective remedy to treat onychomycosis.

"The antifungal Bilayer Nail Lacquer (BNL) reduces the need for frequent drug application, improves cosmetic appearance and yields fruitful therapeutic outcomes. It overcomes problems associated with conventional formulations and offers a novel drug

delivery platform for the successful treatment of onychomycosis," said Dr Zeenat Iqbal, lead investigator of the study, while speaking to India Science Wire.

The researchers used readily available and approved antifungal drug Luliconazole and incorporated it into the matrix of a polymer. The drug was mixed with an organic solvent by using a magnetic stirrer. To this solution, film-forming polymers, plasticisers, humectants, and permeation enhancers were added sequentially to obtain the polymer. The drug-laden, water compatible polymer was obtained after evaporating the solvent.

Following a similar process, a drug-free, waterproof polymer was fabricated as the protective coat. The X-ray diffraction analysis of the formulation showed smaller crystalline area compared to that of the pure drug, indicating its efficacy.

To conduct nail permeation studies, researchers tested the polymer on bovine hooves, as their outer structure is similar to that of the human nails. The tests revealed that the lacquer had an extensive nail plate coverage with high adhesion of the polymer. Over 24 hours, 75% of the drug was released to the nail exhibiting its ability for prolonged drug delivery. The lacquer was also tested in animals for skin-safety and tolerability and found to be within the tolerable limits.

The researchers are now looking for industry collaboration to develop their innovation into a pharmaceutical product. Besides Zeenat Iqbal, the team included Nazia Hassan, Manvi Singh, Sufiyanu Sulaiman, Pooja Jain, Kalicharan Sharma, Shyamasree Nandy, Mridu Dudeja and Asgar Ali. The study result has been published in the journal ACS Omega.

By Susheela Srinivas

## ऊष्मीय अनुकूलन से कम हो सकती है एअर कंडीशनिंग की मांग

21st June 2019



### उमाशंकर मिश्र

गर्मी के मौसम में भारतीय शहरों में एअर कंडीशनिंग का उपयोग लगातार बढ़ रहा है जो ऊर्जा की खपत बढ़ाने के साथ-साथ जलवायु परिवर्तन के लिए भी एक चुनौती बन रहा है। पर्यावरणविदों का कहना है कि इस स्थिति से निपटने के लिए शहरों एवं भवनों को ऊष्मीय अनुकूलन के अनुसार डिजाइन करने से एअर कंडीशनिंग की मांग को कम किया जा सकता है।

सेंटर फॉर साइंस ऐंड एन्वायरमेंट (सीएसई) की आज जारी की गई रिपोर्ट में ये बातें उभरकर आई हैं। इसमें कहा गया है कि भारत के प्रत्येक घर में साल में सात महीने एअर कंडीशनर चलाया जाए तो वर्ष 2017-18 के दौरान देश में उत्पादित कुल बिजली की तुलना में बिजली की आवश्यकता 120 प्रतिशत अधिक हो सकती है। यह रिपोर्ट राजधानी दिल्ली में बिजली उपभोग से जुड़े आठ वर्षों की प्रवृत्तियों के विश्लेषण पर आधारित है। रिपोर्ट में दिल्ली में बिजली के 25-30 प्रतिशत वार्षिक उपभोग के लिए अत्यधिक गर्मी को जिम्मेदार बताया गया है। प्रचंड गर्मी के दिनों में यह आंकड़ा 50 प्रतिशत तक पहुंच जाता है। इस वर्ष 7-12 जून के बीच प्रचंड गर्मी की अवधि में दिल्ली में बिजली की खपत में 25

प्रतिशत की बढ़ोत्तरी दर्ज की गई है जो इस मौसम में होने वाली औसत बिजली की खपत की तुलना में काफी अधिक है।

भविष्य में यह समस्या राष्ट्रीय स्तर पर देखने को मिल सकती है क्योंकि ताप सूचकांक और जलवायु परिवर्तन का दबाव देशभर में लगातार बढ़ रहा है। भारत का ताप सूचकांक 0.56 डिग्री सेल्सियस प्रति दशक की दर से बढ़ रहा है। गर्मी (मार्च-मई) और मानसून (जून-सितंबर) के दौरान ताप सूचकांक में प्रति दशक वृद्धि दर 0.32 डिग्री सेल्सियस देखी गई है। ताप सूचकांक में बढ़ोत्तरी बीमारियों के संभावित खतरों का संकेत करती है। गर्मी के मौसम में देश के दक्षिण-पूर्वी तटीय क्षेत्रों (आंध्रप्रदेश, ओडिशा, तमिलनाडु) और मानसून में उत्तर-पश्चिमी क्षेत्र (गंगा के मैदानी भाग और राजस्थान) में यह खतरा सबसे अधिक हो सकता है।

इस रिपोर्ट के लेखक अविकल सोमवंशी ने बताया कि "ऊर्जा दक्षता ब्यूरो का अनुमान है कि एअर कंडीशनरों के उपयोग से कुल कनेक्टेड लोड वर्ष 2030 तक 200 गीगावाट हो सकता है। यहां कनेक्टेड लोड से तात्पर्य सभी विद्युत उपकरणों के संचालन में खर्च होने वाली बिजली से है। ऊर्जा मंत्रालय के अनुसार, वर्ष 2015 में उपकरणों का कुल घरेलू कनेक्टेड लोड 216 गीगावाट था। इसका अर्थ है कि जितनी बिजली आज सभी घरेलू उपकरणों पर खर्च होती है, उतनी बिजली वर्ष 2030 में सिर्फ एअर कंडीशनर चलाने में खर्च हो सकती है।"

इस अध्ययन में पता चला है कि 25-32 डिग्री सेल्सियस तक तापमान होने पर बिजली की खपत में अधिक वृद्धि नहीं होती। पर, तापमान 32 डिग्री से अधिक होने से बिजली की मांग बढ़ जाती है, जिसके लिए ठंडा करने वाले यांत्रिक उपकरणों का अत्यधिक उपयोग और कम दक्षता से उपयोग जिम्मेदार हो सकता है।

सीएसई की कार्यकारी निदेशक अनुमिता राँय चौधरी ने बताया कि "अत्यधिक गर्मी से निजात पाने के लिए व्यापक स्तर पर वास्तु डिजाइन के अलावा शीतलन से जुड़ी मिश्रित पद्धतियों को प्रोत्साहित करने जरूरत है। इन पद्धतियों में कम बिजली खपत एवं ऊर्जा दक्षता वाले उपकरणों का उपयोग प्रमुखता से शामिल है। ऐसा न करने पर जलवायु परिवर्तन के शमन और ऊर्जा सुरक्षा से जुड़े भारत के प्रयासों को गहरा धक्का लग सकता है।"

रिपोर्ट बताती है कि यह स्थिति राष्ट्रीय कूलिंग एक्शन प्लान के लक्ष्यों को निष्प्रभावी कर सकती है। भारत पहले ही ऊर्जा संकट का सामना कर रहा है, जहां एअर कंडीशनिंग की शहरी पैठ 7-9 प्रतिशत है, और 2016-17 में (भारत ऊर्जा सांख्यिकी रिपोर्ट 2018 के अनुसार) बिजली की घरेलू मांग कुल बिजली खपत का 24.32 प्रतिशत थी। राष्ट्रीय कूलिंग एक्शन प्लान का कहना है कि सभी भवनों के निर्माण में ऊष्मीय अनुकूलन के मापदंडों पर अमल करना जरूरी है और सस्ते आवासीय क्षेत्र को भी इस दायरे में शामिल किया जाना चाहिए।

*इंडिया साइंस वायर*

## अध्ययन

ऊर्जा की खपत कम करने के साथ-साथ जलवायु परिवर्तन ने निपटने में मिलेगी मदद, इस वर्ष राजधानी में बिजली की खपत में 25 फीसद की हुई है बढ़ोत्तरी

## विशेष प्रकार के घर कम करेंगे एसी की मांग

नई दिल्ली, आइएसडब्ल्यू : गर्मी के मौसम में देश के शहरों में एअर कंडीशनर ( एसी ) का उपयोग लगातार बढ़ रहा है जो ऊर्जा की खपत बढ़ाने के साथ-साथ जलवायु परिवर्तन के लिए भी एक चुनौती बन रहा है। पर्यावरणविदों का कहना है कि इस स्थिति से निपटने के लिए विशेष प्रकार के भवनों को डिजाइन करने की जरूरत है जो ऊष्मा का अनुकूलन कर सकें। इससे एसी की मांग कम की जा सकती है।

सेंटर फॉर साइंस एंड इंवायरमेंट ( सीएसई ) की एक रिपोर्ट में कहा गया है कि भारत के हर घर में साल में सात महीने एअर कंडीशनर चलाया जाए तो वर्ष 2017-18 के दौरान उत्पादित कुल बिजली की तुलना में बिजली की आवश्यकता 120 प्रतिशत अधिक हो सकती है। यह रिपोर्ट राजधानी दिल्ली में बिजली उपभोग से जुड़े आठ वर्षों की प्रवृत्तियों के विश्लेषण पर आधारित है। रिपोर्ट में दिल्ली में बिजली के 25-30 प्रतिशत वार्षिक उपभोग के लिए अत्यधिक गर्मी को जिम्मेदार बताया गया है। प्रचंड गर्मी के दिनों में यह आंकड़ा 50 प्रतिशत तक पहुंच जाता है। इस वर्ष 7-12 जून के बीच प्रचंड गर्मी की अवधि में दिल्ली में बिजली की खपत में 25 प्रतिशत की बढ़ोत्तरी दर्ज की गई है जो औसत बिजली की खपत की तुलना में काफी अधिक है।



ग्लोबल वॉर्मिंग बढ़ता है एसी का प्रयोग। प्रतीकचित्रक

बढ़ रहा है ताप सूचकांक : भविष्य में यह समस्या राष्ट्रीय स्तर पर देखने को मिल सकती है क्योंकि ताप सूचकांक और जलवायु परिवर्तन का दबाव देशभर में लगातार बढ़ रहा है। भारत का ताप सूचकांक 0.56 डिग्री सेल्सियस प्रति दशक की दर से बढ़ रहा है। गर्मी ( मार्च-मई ) और मानसून ( जून-सितंबर ) के दौरान ताप सूचकांक में प्रति दशक वृद्धि दर 0.32 डिग्री सेल्सियस देखी गई है। ताप सूचकांक में बढ़ोत्तरी बीमारियों के संभावित खतरों का संकेत करती है।

वर्ष 2030 कर बढ़ेगा बिजली का लोड : इस रिपोर्ट के लेखक अविक्ल सोमवंशी ने बताया कि ऊर्जा दक्षता व्यूरो का अनुमान है

कि एअर कंडीशनरों के उपयोग से कुल कनेक्टेड लोड वर्ष 2030 तक 200 गीगावाट हो सकता है। ऊर्जा मंत्रालय के अनुसार, वर्ष 2015 में उपकरणों का कुल घरेलू कनेक्टेड लोड 216 गीगावाट था। इसका अर्थ है कि जितनी बिजली आज सभी घरेलू उपकरणों पर खर्च होती है, उतनी बिजली वर्ष 2030 में सिर्फ एअर कंडीशनर चलाने में खर्च हो सकती है।

इस अध्ययन में पता चला है कि 25-32 डिग्री सेल्सियस तक तापमान होने पर बिजली की खपत में अधिक वृद्धि नहीं होती। पर, तापमान 32 डिग्री से अधिक होने से बिजली की मांग बढ़ जाती है, जिसके लिए ठंडा करने वाले यांत्रिक उपकरणों का अत्यधिक उपयोग जिम्मेदार हो सकता है।

शीतलन से जुड़ी पद्धतियों को प्रोत्साहन की है जरूरत : सीएसई की कार्यकारी निदेशक अनुमिता रांघ चौधरी ने बताया कि अत्यधिक गर्मी से निजात पाने के लिए व्यापक स्तर पर वास्तु डिजाइन के अलावा शीतलन से जुड़ी मिश्रित पद्धतियों को प्रोत्साहित करने जरूरत है। इन पद्धतियों में कम बिजली खपत एवं ऊर्जा दक्षता वाले उपकरणों का उपयोग प्रमुखता से शामिल है। यह स्थिति राष्ट्रीय कुलिंग एक्शन प्लान के लक्ष्यों को निष्प्रभावी कर सकती है।

# DownToEarth

## ICMR scientists identify new biomarker for malaria

Researchers from National Institute of Research in Tribal Health, Jabalpur has identified a genetic sequence in the body of malaria parasite

By [Aditi Jain](#) Last Updated: Monday 24 June 2019



Detection of malaria infection could become more accurate soon. A team of researchers from Indian Council of Medical Research's Jabalpur-based National Institute of Research in Tribal Health (NIRTH) has identified a genetic sequence in the body of malaria parasite that promises to help develop a more sensitive diagnostic test for the disease.

Currently, tests used for diagnosing malaria are based on a gene, Histidine-rich Protein 2 (HRP2), replete with amino acid Histidine. However, studies have shown that this gene is often absent in some strains of the malaria parasite. Consequently, significant levels of malaria infection were going undetected. Scientists across the world have been searching for new biomarkers that would be more effective. Scientists at NIRTH think an enzyme called glutamate dehydrogenase could

offer a solution. “Our study provides scientific evidence for the conserved nature of glutamate dehydrogenase sequences in Indian isolates which can be used as a potential biomarker for diagnosis of malaria,” said Praveen Kumar Bharti, leader of the research team.

There are several specific genes in every parasite that can be targeted to identify or kill it. However, these genes are not present in equal measure in all the strains of a parasite. While identifying the genes or proteins for diagnostic or therapeutic purposes, scientists choose a gene or protein that shows the least variation across different regions so that it can be used in as wide an area as possible. In scientific terms, such a gene is considered to be well conserved.

In the present study, the scientists looked at three genes: Glutamate dehydrogenase, lactate dehydrogenase and aldolase of *Plasmodium falciparum*, a variety of malarial parasite that is the deadliest.

For this, they collected 514 blood samples of malaria-infected patients from the eight malaria-endemic states in the country, isolated DNA from them and amplified the three genes. The genes were then sequenced and nucleotide composition of the samples was compared. Among the three genes, nucleotide composition of glutamate dehydrogenase was almost the same across the samples.

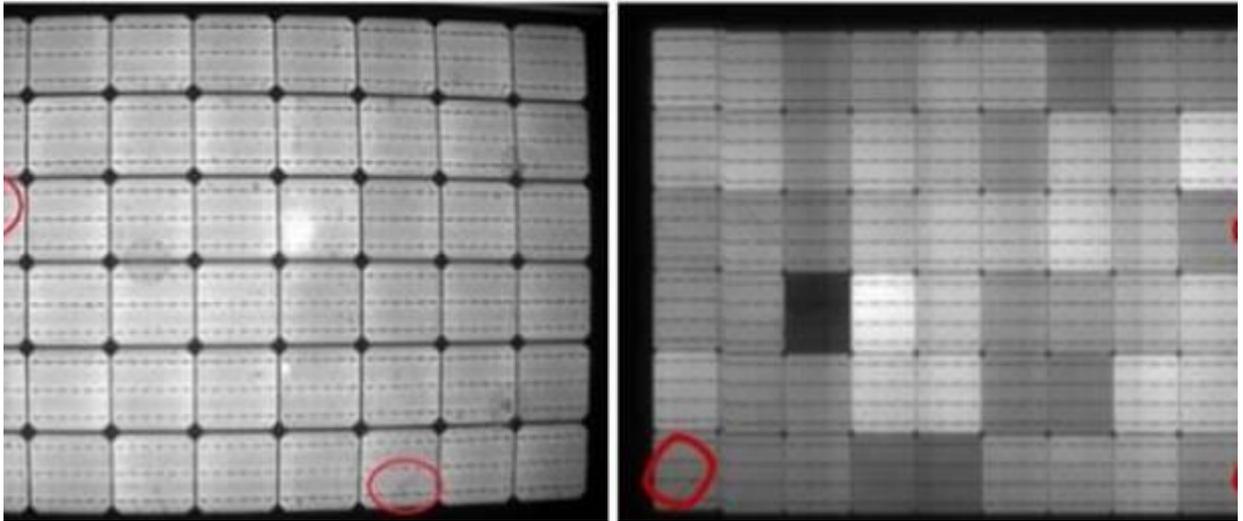
Analysis of the protein structure of this gene revealed that it folded into similar protein structure across the samples, confirming that it could be a potential biomarker for malaria. “We are planning to correlate the level of parasites with that of expression of glutamate dehydrogenase gene and their antigen levels in peripheral blood samples of malaria patients. We will then validate the sensitivity and specificity of the test,” Bharti told *India Science Wire*.

The research team included Amreen Ahmad, Anil Kumar Verma, Sri Krishna, Neeru Singh (National Institute of Research in Tribal Health) and Anjana Sharma (Rani Durgavati University, Jabalpur). The research findings have been published in the journal *PLoS One*.

**(India Science Wire)**

## New technique can help detect micro cracks in solar panels

Sunderarajan Padmanabhan New Delhi | Published on June 24, 2019



A team of researchers has developed a new technique that promises to help detect micro cracks in solar panels more effectively. It makes use of recent developments in internet-aided monitoring of remote systems and fuzzy logic.

Cracks can develop in solar panel at different stages, right from the time of manufacturing to their installation and operation. The most critical stage is when they are in use. The panels can get damaged easily as they have to be kept under different climatic conditions. Problems arise mainly when small cracks develop in cells leading to fluctuations in power output. Identifying such cracks is like searching for a needle in a haystack.

Maintenance agencies employ several tools and techniques to identify cracks but there is no foolproof method available. The new technique developed by researchers at the Department of Electronics Engineering in J.C.Bose University of science and Technology, Faridabad, promises to make the task more efficient.

The performance of solar panels is monitored using current sensors and other tools connected through an internet-assisted network, from a control room. When there is a dip in production, it may be due to cracks in the panels. In such a situation, images of suspected panels are taken with specialized silicon-cooled CCD cameras and these images are enhanced using fuzzy logic to identify cracks.

Micro-cracks in the solar cells can affect total power output of solar module as cells with cracks get disconnected from other cells. The reported losses due to crack defects range from 5 to 10 per cent during manufacturing. These cracks result in overall increase in production costs also.

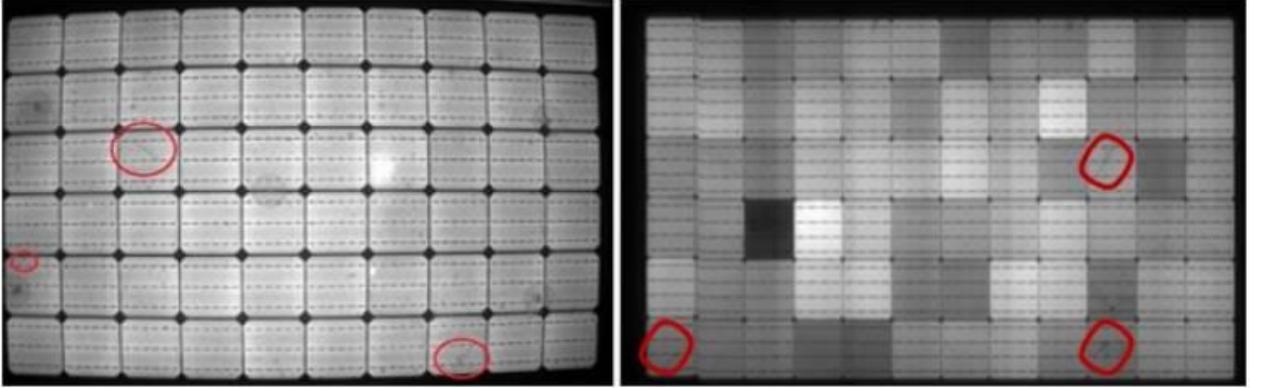
“The key element of the strategy is the use of fuzzy logic. So far no one has used this approach for identifying cracked photovoltaic modules under real-time operational process. We have found that it helps achieve a more efficient identification of the cracks,” explained Rashmi Chawla, lead researcher, while speaking to India Science Wire.

Besides her, the study team included Poonam Singal and Amit Kumar Garg. The research findings have been published journal 3D Research.

(India Science Wire)

Twitter handle: [@ndpsr](https://twitter.com/ndpsr)

## सौर पैनल में सूक्ष्म दरारों का पता लगाने की नई तकनीक



सुंदरराजन पद्मनाभन

नई दिल्ली,

सौर ऊर्जा का उपयोग लगातार बढ़ रहा है और देशभर में सोलर पैनल लगाए जा रहे हैं। लेकिन, दूरदराज के इलाकों में लगाए जाने वाले सोलर पैनल में दरार पड़ जाए तो उनकी कार्यप्रणाली बाधित हो जाती है और विद्युत उत्पादन प्रभावित होता है।

भारतीय शोधकर्ताओं ने इस समस्या से निपटने के लिए इंटरनेट से जुड़ी रिमोट मॉनिटरिंग और फजी लॉजिक सॉफ्टवेयर प्रणाली आधारित एक प्रभावी तकनीक विकसित की है जो सोलर पैनल की दरारों का पता लगाने में मदद कर सकती है।

सौर सेल में बारीक दरारें पड़ती हैं और पावर आउटपुट में उतार-चढ़ाव होने लगता है तो सबसे अधिक समस्या उत्पन्न होती है। सोलर पैनल निर्माण से लेकर उनकी स्थापना और संचालन के विभिन्न चरणों के बीच अक्सर उनमें दरारें पड़ जाती हैं।

सोलर पैनल स्थापित किए जाने के बाद जब वे संचालित हो रहे होते हैं तो दरारों का पता लगाना अधिक मुश्किल हो जाता है। कई बार तेज हवा या फिर अन्य जलवायु परिस्थितियों के कारण भी सोलर पैनल क्षतिग्रस्त हो जाते हैं। बड़े पैमाने पर लगाए जा रहे सोलर पैनलों में पड़ने वाली सूक्ष्म दरारों का पता लगाना भूसे के ढेर में सुई ढूँढ़ने जैसा कठिन कार्य है।

इन सोलर पैनलों का रखरखाव करने वाली एजेंसियां सूक्ष्म दरारों का पता लगाने के लिए कई उपकरणों और तकनीकों का उपयोग करती हैं। लेकिन, इसके लिए कोई आसान और प्रभावी तरीका अभी तक उपलब्ध नहीं है।

फरीदाबाद के जे.सी. बोस यूनिवर्सिटी ऑफ साइंस एंड टेक्नोलॉजी में इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग के शोधकर्ताओं द्वारा विकसित यह नई तकनीक इस कार्य को अधिक कुशल तरीके से निपटाने में उपयोगी हो सकती है।

इस तकनीक में इंटरनेट आधारित नेटवर्क से जुड़े सेंसर और अन्य उपकरणों की मदद से सोलर पैनल की कार्यप्रणाली की निगरानी एक नियंत्रण कक्ष से की जाती है। सोलर पैनल में दरारों के कारण विद्युत उत्पादन में गिरावट हो सकती है।

इस स्थिति में सिलिकॉन-कूल्ड सीसीडी कैमरों द्वारा सोलर पैनलों की तस्वीरें ली जाती हैं और दरारों की पहचान के लिए इन तस्वीरों को फजी लॉजिक की मदद से विस्तारित करके देखा जाता है।

सूक्ष्म दरारों के कारण सौर सेलों का परस्पर संपर्क टूट जाता है, जिससे सोलर पैनल की विद्युत उत्पादन क्षमता प्रभावित होती है। सिर्फ सोलर पैनलों के उत्पादन के समय पड़ने वाली दरारों से ही 5-10 प्रतिशत नुकसान होता है और इस कारण उत्पादन लागत भी बढ़ जाती है।

इस अध्ययन से जुड़ी शोधकर्ता रश्मि चावला ने इंडिया साइंस वायर को बताया कि "इस तकनीक में प्रमुख घटक फजी लॉजिक का उपयोग है। अभी तक इस तकनीक का उपयोग फोटोवोल्टिक मॉड्यूल्स की वास्तविक समय में निगरानी के लिए नहीं किया गया है। सोलर पैनल की दरारों का पता लगाने में इस रणनीति को अधिक प्रभावी पाया गया है।"

डॉ रश्मि चावला के अलावा शोधकर्ताओं की टीम में पूनम सिंघल और अमित कुमार गर्ग शामिल थे। यह अध्ययन शोध पत्रिका 3डी रिसर्च में प्रकाशित किया गया है।

(इंडिया साइंस वायर)

## Engage local communities to protect marine life: study

Besides spreading awareness and providing incentives for community-based policing for conservation, there should be active engagement with all the stakeholders

June 26, 2019



By Sunderarajan Padmanabhan

**New Delhi:** A new study by Wildlife Conservation Society-India has emphasized the need for awareness campaigns, the involvement of local stakeholders in decision-making and empowerment of authorities to help promote the protection of marine species.

The study, based on a survey in Andaman Islands involving enforcement authorities, traders, middlemen and fishermen, found that there was so much lack of awareness that many did not even know which department or authority was responsible for implementing Wildlife Protection Act.

“The stakeholders were confused between the fisheries department, Navy, Coast Guard or forest department. Middlemen fared better than the authorities in this regard and most

were aware it was the onus of the forest department to uphold the Wildlife Protection Act for marine species,” according to the survey findings released by WCS.

The survey found that the authorities were well versed with the protection status of ‘charismatic’ species such as dugongs, dolphins and giant clams. However, awareness was low with regard to species like sea cucumber, seahorses, gorgonians and sea fans, elasmobranchs, and giant groupers, though many of them are in high demand in illegal trade markets.

“While a total ban on harvesting these species may seem to be the solution, a better strategy will be to adopt multiple approaches, given the demand from south east Asia,” said Vardhan Patankar, who conducted the study.



*Tubastrea coral, often sold as red coral in illegal trade market (Photo: Vardhan Patankar)*

Besides spreading awareness and providing incentives for community-based policing for conservation, there should be active engagement with all the stakeholders. It was found that no consultation meetings were conducted with fishermen and others before listing marine species under the Wildlife Protection Act though it is a statutory requirement.

Under the Act, 41 key species (dugong, turtles, giant clams, soft and hard corals, saltwater crocodile, gorgonians, elephants or king shell, whale shark, sawfish, spotted guitar shark, cowrie shell, giant grouper) and all holothurians, sponges, gorgonians, sclera Tinian, sea horse and pipefishes are protected species. The research findings have been published in the journal *Ocean and Coastal Management*.

(India Science Wire)



## Mango leaf extract can prevent steel from corroding: study

By Susheela Srinivas -June 26, 2019



When exposed to the environment, the iron component in steel gradually develops rust due to the formation of oxides. A standard method to prevent this corrosion is to coat the steel with synthetic material. However, synthetics may be toxic and not always environment-friendly.

In a bid to develop a ‘green’ alternative, researchers from the National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram, have fabricated an anticorrosive material made from mango leaves. They have tested the substance on commercial steel specimen and subjected it to harsh environmental conditions. The mango leaf – based product was found to be efficient in inhibiting corrosion.

All plants are rich in phytochemicals which act as their defence mechanism to ward off external destructive agents such as pathogens and predators. Utilising this trait, the researchers zeroed in on the abundantly available mango plant (*Mangifera indica*) for their study.

By using ethanol, phytochemicals were extracted from dried mango leaves as they contain the maximum amount of bioactive elements. Different concentrations of the pure extract were subjected to electrochemical analysis. From these readings, the sample containing 200 ppm of the extract had the highest percentage of anticorrosive property.

“We found that bioactive elements form an iron-polyphenol-insoluble-organometallic-compound, which is responsible for the anti-corrosive property,” explained Dr Nishanth K Gopalan, team leader, while speaking to *India Science Wire*.

The isolated extract was tested for corrosion resistance by using electrochemical impedance spectroscopy. Surface analysis tests conducted using X-ray photoelectron spectroscopy revealed the role of the bioactive elements.

*SINCE THE PURE EXTRACT CANNOT BE SUSTAINED AS A COATING, RESEARCHERS PREPARED A HYBRID BY LOADING THE EXTRACT IN AMORPHOUS SILICA — A COMMONLY USED INORGANIC MATERIAL. THE COMBINATION WAS THEN DISPERSED IN EPOXY TO MAKE IT AVAILABLE AS A COATING MATERIAL.*

Commercial steel specimen was dip-coated with the product and subjected to simulated harsh environmental conditions. The formulation displayed a maximum efficiency of 99%, indicating anticorrosive properties of the mango leaf extract.

The team now plans further experiments to test durability of the product. “We hope to test the extract for different temperature and environmental conditions, and also its efficacy on other alloys,” added Krishnapriya K Veedu, first author of the study.

The research team also included Thejus Peringattu Kalarikkal and Nithyaa Jayakumar from CSIR- National Institute for Interdisciplinary Science and Technology. The results were published in the journal [ACS Omega](#).

(India Science Wire)

## खोज

भारतीय शोधकर्ताओं ने फाइटोकेमिकल्स का उपयोग कर बनाई ईको-फ्रेंडली सामग्री, पत्तियों के अर्क से बनी कोटिंग पूरी तरह से है पर्यावरण के अनुकूल

## आम की पत्तियों से बनाई जंगरोधी सामग्री

बेंगलुरु, आइएसडब्ल्यू : भारतीय शोधकर्ताओं ने आम की पत्तियों के अर्क से एक ईको-फ्रेंडली जंगरोधी सामग्री विकसित की है, जो लोहे को जंग से बचा सकती है। यह सामग्री तिरुवनंतपुरम स्थित राष्ट्रीय अंतरविषयी विज्ञान तथा प्रौद्योगिकी संस्थान के शोधकर्ताओं द्वारा विकसित की गई है।

नई जंग-रोधी सामग्री का परीक्षण वाणिज्यिक रूप से उपयोग होने वाले लोहे पर विपरीत जलवायु परिस्थितियों में करने पर इसमें प्रभावी जंग-रोधक के गुण पाए गए हैं। आमतौर पर, लोहे के क्षरण को रोकने के लिए उस पर पेंट जैसी सिंथेटिक सामग्री की परत चढ़ाई जाती है, जो विषाक्त और पर्यावरण के प्रतिकूल होती है। लेकिन, आम की पत्तियों के अर्क से बनी कोटिंग सामग्री पूरी तरह पर्यावरण के अनुकूल है।

पेड़-पौधों में जैविक रूप से सक्रिय यौगिक (फाइटोकेमिकल्स) पाए जाते हैं जो रोगजनक तत्वों और पराश्रितियों को दूर रखते हैं और पौधों के सुरक्षा तंत्र के रूप में काम करते हैं। शोधकर्ताओं ने पौधों के इन्हों गुणों का अध्ययन किया है और आम के पौधे में प्रचुर मात्रा में पाए जाने वाले फाइटोकेमिकल्स का उपयोग जंग-रोधी पदार्थ बनाने में किया है।



आम की पत्तियों से अर्क बनाने वाले तिरुवनंतपुरम स्थित राष्ट्रीय अंतरविषयी विज्ञान तथा प्रौद्योगिकी संस्थान के शोधकर्ता आइएसडब्ल्यू

कैसे बनाया अर्क : शोधकर्ताओं ने एथेनॉल के उपयोग से आम की सूखी पत्तियों से फाइटोकेमिकल्स प्राप्त किया। सूखी पत्तियों में अधिक मात्रा में जैविक रूप से सक्रिय तत्व पाए जाते हैं। इसके बाद पत्तियों के अर्क की अलग-अलग मात्रा का विद्युत-रासायनिक विश्लेषण किया। 200 पीपीएम अर्क के नमूनों में सबसे अधिक जंग-रोधी गुण पाए गए हैं। अध्ययनकर्ताओं में शामिल डॉ. निशांत के गोपालन ने बताया कि इस शोध में हमें पता

चला है कि जैविक रूप से सक्रिय तत्व मिलकर एक खास कार्वोथात्विक यौगिक बनाते हैं, जिनमें जंग-रोधक गुण होते हैं। पत्तियों के अर्क में जंग-रोधी गुणों का परीक्षण जैव-रासायनिक प्रतिवाधा स्पेक्ट्रोस्कोपी और लोहे की सतह पर जंग का मूल्यांकन एक्स-रे फोटो-इलेक्ट्रॉन स्पेक्ट्रोस्कोपी से किया गया है। इस तरह, शोधकर्ताओं को जैविक रूप से सक्रिय तत्वों की जंग-रोधी क्षमता के बारे में पता चला है। इस कोटिंग सामग्री को 99 प्रतिशत तक जंग-रोधी पाया गया है जो आम के पत्तों के अर्क के जंग-रोधक गुणों को दर्शाता है।

लोहे पर सिर्फ अर्क की परत टिकाऊ नहीं हो सकती। इसीलिए, शोधकर्ताओं ने अर्क को सिलिका के साथ मिलाकर मिश्रण तैयार किया गया है। इस मिश्रण को एक प्रकार की गोंद एपॉक्सी में मिलाकर कोटिंग सामग्री तैयार की गई है। मुख्य शोधकर्ता कृष्णप्रिया के विदु ने कहा कि हम विभिन्न तापमान और पर्यावरणीय परिस्थितियों के अनुसार, आम की पत्तियों के अर्क का परीक्षण करना चाहते हैं। शोधकर्ताओं में डॉ. निशांत के गोपालन और कृष्णप्रिया विदु के अलावा तेजस परिनगट्ट कलारीकल और नित्या जयकुमार शामिल थे।

## Indian astronomers find evidence of supernova remnants

By DR T V VENKATESWARAN 27-06-2019

**F**or several centuries, astronomers have been fascinated by large explosions that occur at the end of a star's lifecycle, resulting in a phenomenon called supernova. A team of Indian astronomers has found tell-tale evidence of a supernova explosion in a star-forming region called G351.7-1.2.

The evidence is in the form of a high velocity jet of atomic hydrogen. The team consisted of scientists from Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram, Indian Institute of Science (IISc), Bengaluru and National Centre of Radio Astrophysics (NCRA), Pune.

The research team, led by V. S. Veena of IIST, found that the jet is in the direction of Scorpius constellation. The explosion should have resulted in a compact stellar object such as a neutron star or a pulsar or a black hole. However, there is no trace of either yet.

Massive stars with mass more than 8-10 times that of our Sun end up as supernova explosions. The explosions brighten to an intensity of million suns for a few days and then slowly fade into oblivion. The bursts throw up vast amounts of gas and particles at high velocity in all directions and they appear mostly circular (in many cases bubble-shaped) with hot filament-like structures. The blasts rip off the outer layers of the dead star while the inner core collapses to become exotic stellar objects such as a neutron star, a pulsar or a black hole.

The group was probing the region G351.7-1.2 using the Giant Metrewave Radio Telescope (GMRT), operated by the National Cen-

**The group was probing the region G351.7-1.2 using the Giant Metrewave Radio Telescope (GMRT), operated by the National Centre of Radio Astrophysics in Pune.**

**"We observed a large number of gas clouds and chanced upon a structure that appeared like a supernova remnant. It was bubble shaped, which is usual for a supernova remnant. Radio observations at different frequencies confirmed this view," explained Veena**

tre of Radio Astrophysics in Pune. "We observed a large number of gas clouds and chanced upon a structure that appeared like a supernova remnant. It was bubble shaped, which is usual for a supernova remnant. Radio observations at different frequencies confirmed this view," explained Veena.

"We found high-velocity jets of atomic hydrogen extending to about 20 light years racing at a speed of about 50 km per second in opposite directions in the neighbourhood. Clearly, there was a supernova explosion. However, despite our efforts, we could not find the leftover of the massive star," observed Sarita Vig, a faculty member at IIST and a member of the study team.

The presence of highly directional jet points towards the presence of a compact object such as a black hole or a neutron star at the centre. "However, our efforts in finding it at low radio frequencies did not yield positive results," added Nirupam Roy, another member of the team based at IISc.

The researchers have not given up hope. "It is possible that the object responsible for the jet is elusive at the observed radio wavelengths. Further studies in other regions of the electromagnetic spectrum may give more hints about the nature of the compact source that is responsible for the genesis of this jet within the supernova remnant", says Jayanta Roy of NCRA and a collaborating member of the study.

Supernovae have a long history. Tycho Brahe, a European astronomer, chanced upon a 'new star', today called as 'Tycho's supernova', way back in 1572, shining brighter than Venus, the brightest object in the night sky. Until it faded in 1574, the new star dazzled the naked eye. Stunned, at its appearance, Tycho published a book 'Concerning the Star, new and never before seen in the life or memory of anyone'. What Tycho observed was not the birth of a new star, 'nova' in Latin, but the spectacular death of a massive star. The name stuck, and stellar explosions are called as 'nova'.

The study team has published its results in the Monthly Notices of Royal Astronomical Society (MNRAS) - Letters.

*(India Science Wire)*

# दैनिक जागरण

## अरुणाचल प्रदेश में मिली कछुए की दुर्लभ प्रजाति

नई दिल्ली, आइएसडब्ल्यू : भारतीय शोधकर्ताओं को अरुणाचल प्रदेश के जंगलों में कछुए की दुर्लभ प्रजाति मनोरिया इंप्रेसो की मौजूदगी का पता चला है। यह प्रजाति मुख्य रूप से म्यांमार, थाईलैंड, लाओस, वियतनाम, कंबोडिया, चीन और मलेशिया में पायी जाती है। पहली बार इस प्रजाति के कछुए भारत में पाए गए हैं।

इस प्रजाति के दो कछुए एक नर और एक मादा को निचले सुबनसिरी जिले के याजली वन क्षेत्र में पाया गया है। इस खोज के बाद भारत में पाए जाने वाले गैर समुद्री कछुओं की कुल 29 प्रजातियां हों गई हैं। इन कछुओं के शरीर पर पाए जाने वाले नारंगी और भूरे रंग के आकर्षक धब्बे इस प्रजाति के कछुओं की पहचान है। गुवाहाटी की संस्था हेल्प अर्थ, बेंगलुरु स्थित वाइल्ड लाइफ कंजर्वेशन सोसाइटी और अरुणाचल प्रदेश के वन विभाग के शोधकर्ताओं ने मिलकर यह अध्ययन किया है।

वनों में रहने वाले कछुओं की चार प्रजातियां दक्षिण-पूर्व एशिया में पायी जाती हैं, जिनमें मनोरिया इंप्रेसो शामिल है। नर कछुए का आकार मादा से छोटा है, जिसकी लंबाई 30 सेंटीमीटर है। मनोरिया वंश के कछुए की इस प्रजाति का आकार एशियाई जंगली कछुओं के आकार का एक-तिहाई है। मध्यम आकार के ये कछुए कम से कम 1300 मीटर की ऊंचाई वाले पर्वतीय जंगलों और नम क्षेत्रों में पाए जाते



पहली बार दिखी है मनोरिया इंप्रेसो प्रजाति।

हैं। हेल्प अर्थ से जुड़े जयदित्य पुरकायस्थ ने बताया कि इस प्रजाति का संबंध मनोरिया वंश के कछुओं से है। मनोरिया वंश के कछुओं की सिर्फ दो प्रजातियां मौजूद हैं। इसमें से सिर्फ एशियाई जंगली कछुओं के भारत में पाए जाने की जानकारी अब तक थी। इस खोज के बाद इंप्रेसो कछुओं का नाम भी इसमें जुड़ गया है।

इस प्रजाति के कछुओं के मिलने के बाद अरुणाचल प्रदेश को कछुआ संरक्षण से जुड़े देश के महत्वपूर्ण क्षेत्रों में शामिल करने पर जोर दिया जा रहा है। शोधकर्ताओं का कहना है कि यह खोज उत्तर-पूर्वी भारत में, विशेष रूप से सीमावर्ती क्षेत्रों में उभयचर और रेंगने वाले जीवों के व्यापक सर्वेक्षण के महत्व को रेखांकित करती है। शोधकर्ताओं की टीम में डॉ. शैलेंद्र सिंह तथा अर्पिता दत्ता और अरुणाचल प्रदेश वन विभाग के बंटी ताओ एवं डॉ. भारत भूषण भट्ट भी शामिल थे।

## Alkaloid from black pepper shows promising results against neurological disorder

Sunderarajan Padmanabhan New Delhi | Published on June 27, 2019



Researchers at Indian Institute of Technology (IIT)-Indore have found that piperine, a natural alkaloid present in black pepper, can be used as a therapeutic agent against neurodegenerative disorder, Fragile X-associated tremor/ataxia syndrome (FXTAS).

The disorder results in progressive cerebellar ataxia, action tremor, Parkinsonism and cognitive decline. It is caused by mutation in a gene called fragile X mental retardation 1 (FMR1), and occurs due to excessive presence of what are called repeats RNA in a specific region of the gene. In patients with FXTAS, the number of repeat RNA could be up to 200, as against normal 55. The excess repeats RNA cause cytotoxicity in neuronal cells. Scientists have been trying to modulate the mutation with chemical molecules but with no success so far.

The IIT Indore team has found that piperine interacts with repeats RNA and reduces the level of cytotoxicity in neuronal cells, in preliminary studies. “We chose piperine as it is widely reported for its anti-carcinogenic activity, hepato-protection, antioxidant, nephron-protective, anti-inflammatory, anti-apoptotic, anti-depressant and neuroprotective nature. Our analysis revealed its selectivity towards repeats RNA that are primarily responsible for FXTAS,” explained Amit Kumar, leader of the research team.

The study has been conducted with two different cell lines derived from patients suffering from FXTAS. These cell lines contained repeats RNA and also exhibited the disease characteristics.

Commenting on the work, Krishnananda Chattopadhyay from CSIR-Indian Institute of Chemical Biology, who was not involved in the study, said, “development of a therapeutic solution for CGC repeats is important for the treatment of different diseases, including FXTAS. The therapeutic potential of piperine has been tested in FXTAS patient derived cell lines. These results are interesting but need to be validated further using suitable animal models.”

Besides Amit Kumar, the team included Arun Kumar Verma, Eshan Khan, Subodh Kumar Mishra and Neha Jain. The study results have been published in journal ACS Chemical Neurosciences.

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# DownToEarth

## Here is how bacterial spray may help conserve decaying monuments

Study identifies bacteria response ble for calcification and hardening of lime

By [Rayies Altaf](#) Last Updated: Thursday 27 June 2019



A close examination of a sixteenth-century Moghul monument facing disfigurement has led scientists to a new method of conserving decaying monuments elsewhere in the country.

The Salabat Khan tomb, located 125 kilometres from Aurangabad in Maharashtra, has been losing its shine and beauty due to white deposits on its surface. The tomb suffers from hard and difficult to remove precipitates of calcium carbonates induced by a leaching of lime due to rainwater and certain bacterial growth.

When rain water seeps into the tomb structure, lime leaches through basaltic rock joints. This leached lime is acted upon by bacteria, which turn it into hard calcified lime. Manager Singh, a researcher from the Delhi-based National Museum Institute of History of Art, Conservation and Museology, decided to dig deep and collected samples from affected parts of the tomb.

From these samples, Singh identified bacteria responsible for calcification and hardening of lime. The microbial populations are of *Bacillus sp*, *Arthrobacter sp*, *Agromyces Indicus* and *Aquamicrobium sp* species. He used petrological analysis, X-Ray diffraction to study chemical and physical composition of the calcite deposits. Partial sequencing of 16S rRNA gene was done for identification of bacteria.

Singh said the organisms that have disfigured the Salabat Khan Tomb could be deployed to protect exteriors of other decaying monuments. “A spray of organisms identified in this study along with calcium carbonate can create calcite layer that will help preserve exteriors of monuments,” he said while speaking to *India Science Wire*.

In Salabat tomb which is made up of black basalt stones, the bacteria led to development of white patches on the surface, but on monuments made of limestone or marble the same bacteria can be applied to prevent them from decay, Singh explained. For instance, he said, bacteria could be used to clean limestone sculptures of Amravati and Nagarjunkonda.

In this method, micro-organisms are evenly sprayed on the surface and are fed with nutritional medium containing calcium and urea. The bacteria then induce carbonate precipitation by creating low acidic medium and converting dissolved calcium into a protective surface coating of calcium carbonate.

A low acidic or alkaline medium is the primary source through which microorganisms promote this precipitation of calcium carbonate, also known as Biocoating.

“The study is a step towards practically proving that living bacteria can be used to clean as well as protect old and historic monuments and also to seal the cracks, if any, without causing any damage to the monument or its surface. Currently marble surfaces of historic monuments are cleaned by applying mud packs, which at times can be damaging. The techniques which we are proposing are safe and simple,” Singh added.

The white patches on the tomb, meanwhile, have been removed by plugging joints in the structure and extensive physico-chemical processes. The study results have been published in journal *Current Science*.

(India Science Wire)



