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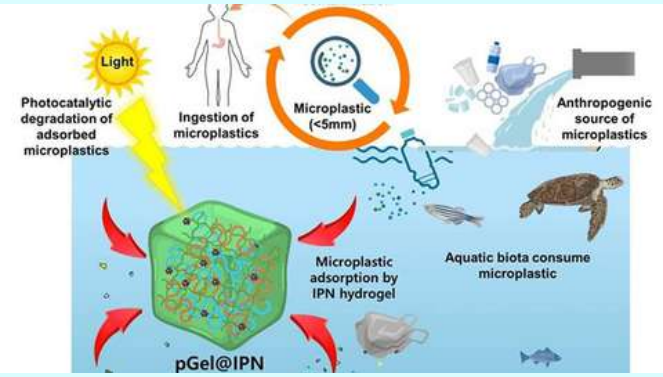
SCIENCE & TECHNOLOGY

IISc researchers design novel hydrogel to remove microplastics from water

It can bind the contaminants and degrade them using UV light irradiation

Researchers at the Indian Institute of Science (IISc) have designed a sustainable hydrogel to remove microplastics from water.

According to IISc, microplastics pose a great threat to human health as this tiny plastic debris can enter our bodies through the water we drink and increase the risk of illness. They are an environmental hazard and are found even in remote areas such as polar ice caps and deep ocean trenches, endangering aquatic and terrestrial lifeforms.



The IISc team found that the hydrogel could remove over 90% of microplastics during experiments.

Three-layer polymer

The sustainable hydrogel designed by the researchers has a unique intertwined polymer network that can bind the contaminants and degrade them using UV light irradiation. Scientists have previously tried using filtering membranes to remove microplastics. However, the membranes can become clogged with these tiny particles, rendering them unsustainable. Instead, the IISc team led by Suryasarathi Bose, Professor at the Department of Materials Engineering, decided to turn to 3D hydrogels. The IISc said the novel hydrogel developed by the team consists of three different polymer layers – chitosan, polyvinyl alcohol and polyaniline – intertwined together, making an interpenetrating polymer network (IPN) architecture.

The team infused this matrix with nanoclusters of a material called copper substitute polyoxometalate (Cu-POM). These nanoclusters are catalysts that can use UV light to degrade the microplastics. The combination of the polymers and nanoclusters resulted in a strong hydrogel with the ability to adsorb and degrade large amounts of microplastics.
"Along with treatment or removal of microplastics, another major problem is detection. Because these are very small particles, you cannot see them with the naked eye," said Soumi Dutta, first author of the study published in Nanoscale.

Source:https://www.thehindu.com/news/national/karnataka/iisc-researchers-design-novel-hydrogel-to-remove-microplastics-from-water/article68058021.ece

SCIENCE & TECHNOLOGY

Researchers develop new technique to measure blood glucose using smartphone

Researchers at NIST discovered a technique to use the magnetometer on a smartphone to detect glucose

The technology could be used to develop glucose testing kits cheaper than an off-the-shelf device currently available.

The US government's National Institute of Standards and Technology announced on April 2 that its researchers have developed a technique to use the magnetometer on an ordinary cellphone to measure the concentration of glucose in blood with high accuracy.

Pretty much all modern cell phones have a magnetometer that acts like a compass, detecting the direction of Earth's magnetic field. This is very useful for navigation and other purposes. However, the researchers were able to use it for a completely different purpose. The researchers believe that the smartphone can be used to measure a host of different molecules and biomarkers in blood.

In the proof of concept study, the researchers strapped a tiny well containing a solution (used instead of blood for testing) to a cellphone along with a strip of hydrogel. Hydrogel is a porous material that swells when put in water. They also embedded tiny magnetic particles within the hydrogel after engineering it to react to the presence of glucose or pH levels (acidity measurement) by expanding and contracting. Changes in pH levels can sometimes indicate different disorders.

When the hydrogel particles expand or shrink, they move the magnetic particles closer to or farther away from the magnetometer in the cell phone. And the magnetometer could detect the corresponding changes in the strength of the magnetic field. They claim to have used this strategy to measure even extremely small glucose concentrations. Such high sensitivity is not required for at-home glucose monitoring, but this technology could, in the future, allow for testing glucose in saliva, which contains a much smaller concentration of sugar.

The NIST team said that the smart hydrogels they used are inexpensive and relatively easy to fabricate. In theory, these could be sold as cheap test kits that could then be attached to your phone to use a particular app to measure your blood glucose level. Since this technique does not use any electronics or technology beyond that found in a smartphone, it could potentially act as a low-cost test method compared to currently available alternatives.

Source:https://indianexpress.com/article/technology/science/blood-glucose-measuring-smartphone-9249025/

CSIR-NIIST transfers technology for bio tableware, plant leather

Collaboration brings together NIIST's expertise in developing cutting-edge technologies with Aquagri's experience in seaweed cultivation and processing, and IFFCO's farmer connect

Anandharamakrishnan, Director, CSIR-NIIST, and Tanmaye Seth, Director, Aquagri Processing, exchange documents after signing a memorandum of understanding for transferring technology for manufacturing bio tableware in Thiruvananthapuram

The CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) on Thursday inked a pact with Tamil Nadu-based Aquagri Processing Pvt. Ltd. for transferring the technology it developed for manufacturing multi-use biodegradable tableware and plant leather from seaweed and chitosan. Anandharamakrishnan, Director, CSIR-NIIST, Thiruvananthapuram, and Tanmaye Seth, Director, Aquagri Processing, exchanged the documents of the memorandum of understanding (MoU) at a function held on the institute campus at Pappanamcode, here.

Aquagri Processing, a venture in which the Indian Farmers Fertiliser Cooperative (IFFCO) has a 50% stake, produces seaweed-based organic products for use in agriculture, animal husbandry, and food processing.
Dr. Anandharamakrishnan said the collaboration had brought together NIIST's expertise in developing cutting-edge technologies with Aquagri's experience in seaweed cultivation and processing, and IFFCO's extensive agricultural distribution and farmer connect.

Better income for farmers

Noting that India's 8,100 km-long coastline has an Exclusive Economic Zone (EEZ) of 2.17 million km2 (equal to 66% of the total mainland area), he said nearly 30% of human population was in one way or the another dependent on the rich exploitable coastal and marine resources. According to him, utilisation of sea waste (seaweed and chitin) for the production of multi-use biodegradable products and plant leather will help increase the income of farmers in rural coastal regions of the country through value addition and also reduce the biomass pollution in sea waste.

Source:https://www.thehindu.com/news/national/kerala/csir-niist-transfers-technology-for-bio-tableware-plant-leather/article67924795.ece

SCIENCE & TECHNOLOGY

Assam scientists make biodegradable packaging with freshness indicator

The work was led by Dr Swapnali Hazarika, Senior Principal Scientist at NEIST, and assisted by Krishnakamal Hazarika, Dr Achyut Konwar.

According to the World Health Organization (WHO), an estimated 600 million, or nearly one in ten people, cases of illness were caused by contaminated food supplies in 2023, and 420,000 people die each year as a result of contamination from food, which led to the loss of 33 million healthy life years. Food packaging retains product quality, reduces product damage, aids in transportation, allows safe storage, and acts as another type of product communication. Packaging plays a significant role in maintaining or monitoring food quality.

Scientists from the North East Institute of Science and Technology, Jorhat, have developed a biodegradable packaging bag for meat and fish with freshness indicator. The work was led by Dr Swapnali Hazarika, Senior Principal Scientist at NEIST, and assisted by Krishnakamal Hazarika, Dr. Achyut Konwar.

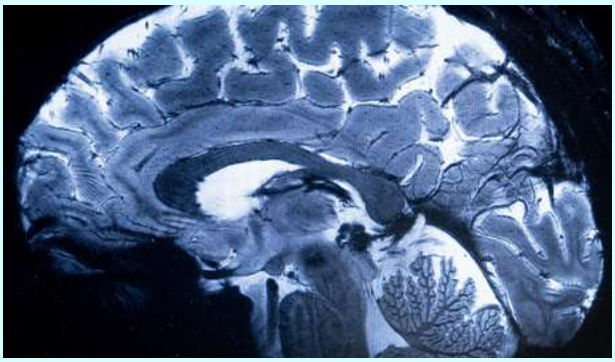
“We have developed a biodegradable packaging system and directly converted it into a bag by using heat sealing. The cellulose nanofiber used in the process was obtained from grass, a waste product that contains approximately 30-40% cellulose. The cellulose acetate and nanofiber composite film is converted into smart packaging materials by the addition of natural dyes obtained from vegetables,” Swapnali told EastMojo. Finally, the Cellulose acetate composite film was converted to an intelligent packaging material by coating its surface with natural anthocyanin.

She said due to the colour-changing property of Anthocyanin present in dyes, it changes the colour of the packaging bag and indicates the spoilage of fish or meat inside the bag. In another sense, the bag will indicate the freshness of meat and fish inside the packaging bag. “The developed bag is biodegradable in nature and there is no threat to the environment,” she added.

Source:https://www.eastmojo.com/assam/2024/03/31/assam-scientists-make-biodegradable-packaging-with-freshness-indicator/?Y29uc3VtcHRpb24=8777c73b-4882-40db-8523-a769678e5ae1

World’s most powerful MRI scans first images of human brain

One of the main goals of such a powerful scanner is to refine our understanding of the anatomy of the brain



“Iseult”, the world’s most powerful MRI scanner, has delivered its first images of the human brain and is expected to provide a better understanding of its functioning and of certain neurodegenerative and psychiatric diseases

The world's most powerful MRI scanner has delivered its first images of human brains, reaching a new level of precision that is hoped will shed more light on our mysterious minds — and the illnesses that haunt them.

Researchers at France's Atomic Energy Commission (CEA) first used the machine to scan a pumpkin back in 2021. But health authorities recently gave them the green light to scan humans.

Over the past few months, around 20 healthy volunteers have become the first to enter the maw of the magnetic resonance imaging (MRI) machine, which is located in the Plateau de Saclay area south of Paris, home to many technology companies and universities.

"We have seen a level of precision never reached before at CEA," said Alexandre Vignaud, a physicist working on the project. The magnetic field created by the scanner is a whopping 11.7 teslas, a unit of measurement named after inventor Nikola Tesla. This power allows the machine to scan images with 10 times more precision than the MRIs commonly used in hospitals, whose power does not normally exceed three teslas.

On a computer screen, Vignaud compared images taken by this mighty scanner, dubbed Iseult, with those from a normal MRI. "With this machine, we can see the tiny vessels which feed the cerebral cortex, or details of the cerebellum which were almost invisible until now," he said. France's research minister Sylvie Retailleau, herself a physicist, said "the precision is hardly believable!"
"This world-first will allow better detection and treatment for pathologies of the brain," she said in a statement to AFP.

Source:https://www.thehindu.com/sci-tech/science/worlds-most-powerful-mri-scans-first-images-of-human-brain/article68022857.ece?cx_testId=53&cx_testVariant=cx_1&cx_artPos=1&cx_experienceId=EXPO56ZDYSGX#cxrecs_s

ENVIRONMENT

A serendipitous discovery that led to identification of a new species of garden balsam in Kerala

Named Impatiens neo-uncinata, it bears morphological resemblances to Impatiens uncinata. However, it differs from the latter in the size of the flowers, basal and distal lobes, the dorsal petal and pollen

Impatiens neo-uncinata: a frontal view of the flower

A small plant with attractive milky-white flowers with red stripes discovered in the Western Ghats has now been identified as a rare, wild cousin of the popular garden balsam.

Researchers stumbled upon the herb during a floristic survey in the Agasthyamala biosphere reserve in Thiruvananthapuram district. They initially took it for Impatiens uncinata, a familiar species of the genus Impatiens, to which the garden balsams also belong.

But a closer look had prompted a detailed scientific study, which eventually resulted in the plant being labelled a new species of Impatiens (family Balsaminaceae).

S. Arya, assistant professor, PG and Research Department of Botany, PSG College of Arts and Science, Coimbatore, and V.S. Anil Kumar, Principal, Government College, Kasaragod, who was instrumental in its discovery and identification, has named it Impatiens neo-uncinata.

A paper written by them in the scientific journal Phytotaxa highlights the herb's serendipitous discovery, its distinguishing characteristics and its botanical importance. What makes Impatiens neo-uncinata special is that it has been reported only from a single locality at an elevation ranging from 1,000 to 1,250 m, and that too in a very few numbers.

Its remote location and low population have prompted the researchers to recommend that it be categorised as 'Endangered' using IUCN criteria.

Source: https://www.thehindu.com/sci-tech/energy-and-environment/a-serendipitous-discovery-that-led-to-identification-of-a-new-species-of-garden-balsam-in-kerala/article68061499.ece

Scientists investigate thousands of dead Antarctic penguins for bird flu

While the researchers suspect the deadly H5N1 bird flu virus killed the penguins, the field tests were inconclusive.

Has bird flu already killed hundreds, if not thousands of penguins in Antarctica?

That's what researchers are seeking to find out after a scientific expedition last month found at least 532 dead Adelie penguins, with thousands more thought to have died, according to a statement from Federation University Australia.

While the researchers suspect the deadly H5N1 bird flu virus killed the penguins, the field tests were inconclusive, the university said. Samples are being shipped off to labs that the researchers hope will provide answers in coming months.

Scientists are concerned specifically that the often fatal H5N1 influenza could decimate threatened species of penguins and other animals on the remote southern continent.

The disease has spread more aggressively in wildlife than ever before since arriving in South America in 2022 and rapidly made its way to Antarctica, where the first case of H5N1 was confirmed in February.

"This has the potential to have a massive impact on wildlife that is already being impacted by things like climate change and other environmental stresses," said Meagan Dewar, a wildlife biologist with Federation University, who participated in the latest expedition.

Dewar told Reuters that the dead Adelie penguins were found frozen solid in the sub-zero temperatures and covered in snow on Heroina Island. Dewar and the small team of researchers were not able to tally all of the carcasses on the large island, estimating that several thousand died in total at some time in the proceeding weeks or months.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/scientists-investigate-thousands-of-dead-antarctic-penguins-for-bird-flu/article68031767.ece

ENVIRONMENT

Scientists are grasping at straws while trying to protect infant corals from hungry fish

South Florida researchers are using biodegradable drinking straws to prevent laboratory-grown coral from becoming really expensive fish food

This July 26, 2023 image shows a 'Coral Fort' researchers are using to prevent laboratory-grown coral from being eaten by parrot fish.

South Florida researchers trying to prevent predatory fish from devouring laboratory-grown coral are grasping at biodegradable straws in an effort to restore what some call the rainforest of the sea.

Scientists around the world have been working for years to address the decline of coral reef populations. Just last summer, reef rescue groups in South Florida and the Florida Keys were trying to save coral from rising ocean temperatures. Besides working to keep existing coral alive, researchers have also been growing new coral in labs and then placing them in the ocean.

But protecting the underwater ecosystem that maintains upwards of 25% of all marine species is not easy. Even more challenging is making sure that coral grown in a laboratory and placed into the ocean doesn't become expensive fish food.

Marine researcher Kyle Pisano said one problem is that predators like parrot fish attempt to bite and destroy the newly transplanted coral in areas like South Florida, leaving them with less than a 40% survival rate. With projects calling for thousands of coral to be planted over the next year and tens of thousands of coral to be planted over the next decade, the losses add up when coral pieces can cost more than $100 each.

Pisano and his partner, Kirk Dotson, have developed the Coral Fort, claiming the small biodegradable cage that's made in part with drinking straws boosts the survival rate of transplanted coral to over 90%.

"Parrot fish on the reef really, really enjoy biting a newly transplanted coral," Pisano said. "They treat it kind of like popcorn."

Source:https://www.thehindu.com/sci-tech/science/scientists-are-grasping-at-straws-while-trying-to-protect-infant-corals-from-hungry-fish/article68053421.ece

Climate change is causing marine 'coldwaves' too, killing wildlife

Surface temperatures can plummet rapidly — by 10ºC or more over a day or two. When these conditions persist for several days or weeks, the area experiences a "coldwave."

The effects of ocean warming are profound and well-documented. But sometimes changes in the patterns of winds and ocean currents cause seawater to suddenly cool, instead.

Surface temperatures can plummet rapidly — by 10ºC or more over a day or two. When these conditions persist for several days or weeks, the area experiences a "coldwave", which is the opposite of more familiar marine heatwaves.

When a "killer coldwave" manifested along South Africa's southeast coast in March 2021, it killed hundreds of animals across at least 81 species. More worrying still was the fact these deaths included vulnerable manta rays and even specimens of notoriously robust migratory bull sharks. In southern Africa, bull sharks, whale sharks and manta rays have previously washed up dead following such sudden cold events, especially over the past 15 years.

As we report in Nature Climate Change, the conditions that can drive these killer coldwaves have grown increasingly common over the past four decades. Ironically, strengthening winds and currents as a result of climate change can also make these deadly localised coldwaves more likely in places such as the east coasts of South Africa and Australia, potentially putting even highly mobile species such as sharks in harm's way.

Certain wind and current conditions can cause the sea surface to cool, rather than warm. This happens when winds and currents force coastal waters to move offshore, which are then replaced from below by cold water from the deep ocean. This process is known as upwelling.

Source:https://www.thehindu.com/sci-tech/science/climate-change-is-causing-marine-coldwaves-too-killing-wildlife/article68071032.ece

ENVIRONMENT

Melting ice sheets may postpone need for 'negative leap second'

Glaciers are melting so fast that we may need to delay adding that 'negative leap second' to keep clocks aligned with Earth's rotation.

The redistribution of ocean mass from melting ice is messing with the Earth's spin cycle in a new way, according to a new study.

It's a well-known fact that climate change has been messing with the weather and sea levels. But according to a new study published in the science journal Nature, it may even be altering how we keep time. The study notes that as glaciers and ice sheets in Greenland and Antarctica melt at an accelerating rate thanks to rising temperatures, all that extra liquid is redistributing weight across the planet. That's ever-so-slightly slowing down the Earth's rotation on its axis.

Our clocks and calendars are based on this rotation rate, which is managed by scientists calculating what's called Coordinated Universal Time (UTC). But the rotation hasn't been perfectly steady. In fact, for a few decades now, the Earth has actually been spinning a tiny bit faster than normal. To account for that speedup, timekeepers have periodically added a "leap second" to clocks around the world – they've done it 27 times since the 1970s. The plan was to subtract that leap second for the first time in 2026, a tweak they nicknamed the "negative leap second."

But this new research suggests the accelerating melt from Antarctica and Greenland has acted like a brake, slowing the rotation back down just enough that we may not need that negative leap second until 2029 or later.

According to the study's author, Duncan Agnew from the University of California San Diego who spoke to AFP, "It's kind of impressive, even to me, that we've done something that measurably changes how fast the Earth rotates […] Things are happening that are unprecedented." He warns that when we do eventually need to implement that negative leap second adjustment, it could cause major headaches for computer systems not designed to handle a subtraction of time like that.

Source:https://indianexpress.com/article/science/melting-ice-negative-leap-second-postpone-9244686/

Scientists find 'pristine' ocean mountain range with 50 unknown species

Scientists announced the discovery of 160 marine species after exploring the Salas y Gómez underwater mountain chain in the Southeastern Pacific Ocean.

Fish (possibly a mix of Sargocentron wilhelmi and Pristilepsis oligolepis) seen during the expedition.

An international team of scientists last week announced they discovered 160 species when exploring 10 seamounts and two islands on the 2,900-kilometre-long ocean ridge Salas y Gómez. They suspect that at least 50 of those species are new to science. They discovered squid, fish, corals, mollusks, sea stars, glass sponges, sea urchins, crabs, and squat lobsters, and other species.

They also potentially set a record for sighting the deepest-known photosynthesis-dependent animal — Leptoseris or the wrinkle coral. The findings come from a 40-day expedition across the Salas y Gómez Ridge to Rapa Nui, more commonly known as Easter Island.

"The observation of distinct ecosystems on individual seamounts highlights the importance of protecting the entire ridge, not just a few seamounts. We hope the data collected from this expedition will help establish new marine protected areas, including on the high seas on the Salas y Gómez Ridge," said chief scientist Erin E Easton of the University of Texas Rio Grande Valley, in a press statement.

The ridge has over 110 seamounts and it supports the migration of many marine animals like whales, sea turtles, swordfish, tuna and sharks. 78,000 square metres were mapped by the scientists during the expedition. This includes six seamounts that have not yet been documented in hydrographic surveys. "The astonishing habitats and animal communities that we have unveiled during these two expeditions constitute a dramatic example of how little we know about this remote area. These expeditions will help alert decision-makers about the ecological importance of the areas and contribute to strengthening protection strategies within and beyond jurisdictional waters," added Javier Sellanes of the Universidad Católica del Norte in a press statement.

Source: https://indianexpress.com/article/technology/science/underwater-mountain-range-50-unknon-species-9275531/

CMFRI launches mobile app to encourage citizen science initiative in marine fisheries research

By bridging the gap between citizen science and cutting-edge technology, the app transforms every user into a crucial contributor to the understanding and preservation of marine biodiversity

The ICAR-Central Marine Fisheries Research Institute (CMFRI) has come up with an innovative mobile app 'MARLIN@CMFRI' to encourage citizen science initiatives in marine fisheries research. A gateway for comprehensive media sharing, this app is poised to transform marine fisheries research, species identification, and assessment efforts within India's Exclusive Economic Zone (EEZ).

'MARLIN@CMFRI' allows the public to effortlessly upload photos of marine fish species encountered in the vast expanse of the Indian EEZ, leading to the development of a rich visual repository of marine fishery resources. The app encourages users to provide species details ensuring that the database is scientifically enriched, facilitating accurate species identification. This data will contribute to the development of a sophisticated, AI-powered system for automated identification of marine fishery resources.

Geotagging is a pivotal feature of this mobile app that enables users to pinpoint the exact location where each marine species was landed. This data enhances the precision of the database, providing crucial information for researchers and conservationists studying the distribution patterns of various species within the Indian EEZ.

Highlighting the newly launched app, Dr A Gopalakrishnan, Director of CMFRI, said, "The app is a collaborative platform that unites individuals passionate about marine conservation. By bridging the gap between citizen science and cutting-edge technology, 'MARLIN@CMFRI' transforms every user into a crucial contributor to the understanding and preservation of marine biodiversity."

The app was developed under a project led by Dr Eldho Varghese at the Fishery Resources Assessment, Economics and Extension division of CMFRI.

Source:https://agriculturepost.com/agri-research/cmfri-launches-mobile-app-to-encourage-citizen-science-initiative-in-marine-fisheries-research/

ICAR, Dhanuka Agritech sign MoU to strengthen research and extension activities

The key focus area of the MoU is engagement in farmer training programmes along with demonstrations and jointly publishing literature as well as other media to promote modern agricultural practices

The Indian Council of Agricultural Research (ICAR) and Dhanuka Agritech entered a memorandum of understanding (MoU) forging a partnership by leveraging the resources of both organisations to strengthen the research and extension activities.

The partnership is envisaged to bring a paradigm shift in the agricultural sector by promoting the spread of scientific and technological information knowledge, and know-how of the new technologies that are developed by industries and ICAR institutes to disseminate them effectively to large number of farmers by making them available with various institutes and other stakeholders through frontline demonstrations and farmers' training.

The MoU was signed by Dr. RG Agarwal, Chairman of Dhanuka Group and Dr. US Gautam, Deputy Director General-Agriculture Extension of ICAR. "The alliance aims to disseminate scientific and technological knowledge among the farming community and other stakeholders," Dr. Agarwal said after the MoU was inked at the IARI-Pusa Campus on March 19, 2024.

"The primary goal of this MoU is to extend scientific and technological advancements to a vast number of farmers, institutes, e-regional stations, e-KVKs, enhancing their knowledge and practices in agriculture," he added. The key focus area of the MoU is engagement in farmer training programmes along with demonstrations and jointly publishing literature as well as other media to promote modern agricultural practices.

Source:https://agriculturepost.com/agri-research/icar-dhanuka-agritech-sign-mou-to-strengthen-research-and-extension-activities/

AGRICULTURE

Mango output is set to increase by 14% this year; heat wave unlikely to impact yields

The total production of mangos could jump to 24 million tonnes in the 2023-24 crop year, as against 21 million tonnes in 2022-23

India is a major mango-growing country, contributing nearly 42% of the world's production

India's overall mango production may increase by about 14% to 24 million tonnes this year, ICAR-Central Institute for Subtropical Horticulture Director T. Damodaran said on April 3.

The India Meteorological Department's forecast of a heat wave in the April-May period may not have a significant impact on the mango yield, provided farmers take care of irrigation in May to reduce fruit dropping, he said.

In its latest summer forecast, India Meteorological Department (IMD) has predicted harsher bouts of heat waves that could last for 10-20 days instead of the usual two to four days. Above normal heatwave days are likely to occur over most parts of the south peninsula, central India, east India and plains of northwest India.

"The mango flowering process is a crucial part of the fruit setting process. Thanks to conducive weather, mango flowering is almost over. The pollination is normal and fruit setting has begun. Normal heat waves may not impact yields but will indirectly help the crop," Mr. Damodaran told PTI.

The prospects of the mango crop are good as of now. Total production could increase to 24 million tonnes in the 2023-24 crop year (July-June), as against 21 million tonnes in 2022-23, he said. The mango output is seen to be bumper in South India, which contributes 50% of the total country's production. Last year, Southern states faced 15% loss due to weather aberrations. However, the situation is better this year, he added. Mango is an important fruit crop in India and popularly called the 'King of Fruits'. India is a major mango-growing country, contributing nearly 42% of the world's production.

Source: https://www.thehindu.com/sci-tech/agriculture/mango-output-is-set-to-increase-by-14-this-year-heat-wave-unlikely-to-impact-yields/article68023653.ece

Experts call for continued biotech interventions to harness the full potential of GM cotton in India

India is poised to be a global hub for the textile industry. Several states including Maharashtra, Telangana and Tamil Nadu have undertaken a slew of initiatives to establish exclusive textile parks. In this context, cotton experts and scientists on Thursday said that a concerted push for genetically modified (GM) cotton will be vital to ensure a robust textile value chain and achieve the aspirations of the states. GM cotton with new traits will remain pivotal to this ambition.

At a brainstorming workshop on 'Biotech Interventions in Cotton Improvement: Opportunities and Challenges', organised by the ICAR- Central Institute for Cotton Research (CICR), Nagpur in association with Biotech Consortium India Limited (BCIL), with support from the Federation of Seed Industry of India (FSII), today, at ICAR-CICR campus in Nagpur, experts said the future of GM cotton in India will be determined by a complex interplay of technological, regulatory, socio-economic, and environmental factors. Cotton researchers and agricultural experts emphasised the necessity of continued innovation, responsible stewardship, and stakeholder collaboration for harnessing the full potential of modern biotechnologies-genetic engineering and gene editing.

Bt-cotton brought a revolution in the country's cotton production and transformed a cotton-importing country into a leading cotton producer. However, the momentum broke with the decline in production in FY2015. Since then, affected by pest infestation, specifically, pink bollworm, cotton production in the country has been in constant stagnation.

Addressing challenges and ensuring responsible stewardship of the technology will be essential for sustaining its benefits and promoting the long-term viability of cotton farming in India. To counter these challenges, the need for biotechnological interventions in cotton improvement is the most pressing issue in India.

Source:https://agriculturepost.com/agri-research/experts-call-for-continued-biotech-interventions-to-harness-the-full-potential-of-gm-cotton-in-india/

HEALTH

Can intermittent fasting worsen heart health? What a new study says

Findings from the study were presented recently at an international conference.

Experts said while the study's data are not conclusive, they do flag the risks of intermittent fasting, and such diets should not be followed without consulting a doctor.

While intermittent fasting has grown in popularity, especially with its promise of improved insulin sensitivity among diabetics, a recent study has made an alarming claim — it increases the risk of death due to cardiovascular death by 91%.

Findings from the study were presented recently at an international conference. Experts said while the study's data are not conclusive, they do flag the risks of intermittent fasting, and such diets should not be followed without consulting a doctor. Intermittent fasting is essentially a time-restricted diet, where the day's calorie requirements are consumed over a period of eight to twelve hours, with participants fasting for the rest of the day.

Studies that tracked participants on such diets for short periods — three months to a year — have shown benefits such as weight-loss, increased insulin sensitivity, and better control of diabetes. The data presented recently tried to look at the long-term impact of intermittent fasting, following 20,000 adults from a US database for eight to 17 years.

It found that people who ate all of their food in less than 8 hours per day had a 91% higher risk of death due to cardiovascular disease. Among people already living with heart diseases, intermittent fasting increased the risk of death due to heart disease and stroke by 66%.

Why can intermittent fasting be harmful?

Anoop Misra, Chairman of Fortis C-Doc Hospital for Diabetes and Allied Sciences, New Delhi, offered some explanations.

Source:https://indianexpress.com/article/explained/explained-health/can-intermittent-fasting-worsen-heart-health-what-a-new-study-says-9225456/

Identifying Genes for Stress Management in Licorice Plants

Understanding the complex network of proteins that transport various substances across cellular membranes is crucial for advancing our knowledge of plant biology and improving agricultural practices. Among these proteins, ATP-binding cassette (ABC) transporters play a pivotal role. They are a large family of proteins that use energy from ATP hydrolysis to transport a wide range of substrates across biological membranes, affecting processes from growth and development to stress responses.

Researchers at CSIR-IIIM Jammu have conducted a groundbreaking study[1] focusing on a particular plant, Glycyrrhiza glabra, commonly known as licorice. The study has expanded our understanding of ABC transporters by identifying a total of 181 members of this protein family in G. glabra, which they have classified into six subfamilies. This discovery is significant as it provides a more comprehensive view of the diversity and potential functions of these transporters in a species not previously studied in this context.

The study revealed that nine of these transporters, referred to as GgABCBs, showed a significant increase in their transcript levels in response to the plant hormone auxin. Auxin is known to be a key regulator of plant growth and development, and these findings suggest that these nine ABC transporters could be important for auxin transport within the plant. The use of an auxin transport inhibitor further demonstrated that these ABC transporters are indeed responsive to auxin, as their expression was downregulated in shoots but upregulated in roots when the inhibitor was applied at higher concentrations.

Source:https://naturalsciencenews.com/article/915

HEALTH

Can 200 g yoghurt daily reverse prediabetes and lower blood sugar? Here's understanding an Iranian study

Dr Jasjeet Singh Wasir, Director, Endocrinology and Diabetology, Medanta, Gururgam, on how you should factor this in your diet plan

The benefits of yoghurt have been documented in community-based prospective studies as well as in meta analysis of numeral studies

Could yoghurt hold the secret to reversing your prediabetes, where your blood sugar levels are higher than normal but still not enough to make you a diabetic? According to a new study in Iran, that tracked over 300 participants for nine years, daily consumption of full-fat yoghurt (200 g) helped them reverse hyperglycaemia and prevent its progression to Type 2 diabetes.

Dr Jasjeet Singh Wasir, Director, Endocrinology and Diabetology, Medanta, Gururgam, agrees that yoghurt can potentially benefit people with prediabetes as Indians tend to progress very quickly to full blown diabetes. "However, it will be incorrect to say that yoghurt alone will reverse prediabetes unless backed up by other corrective measures," he adds.

What's the connection between full fat yoghurt and blood sugar?

The benefits of yoghurt have been documented in community-based prospective studies as well as in meta analysis of numeral studies. It is rich in essential fatty acids and probiotics that contribute to better gut health. As we all know, a healthy gut microbiome with good bacteria prevents the development of obesity, diabetes and heart disease. Yoghurt is anti-oxidant and anti-inflammatory. Some of its essential fatty acids work on reducing blood sugar over long-term consumption. Even the United States Food and Drug Administration (FDA) allowed yoghurt manufacturers to advertise the role of yogurt in reducing the risk of Type 2 diabetes. The FDA agreed to the claim that eating at least two cups of yoghurt per week may reduce the chance of developing diabetes. A 2015 Chinese study, published in PLOS One, found that probiotics significantly reduced fasting blood glucose and fasting plasma insulin levels. Lower levels of fasting plasma insulin indicate more effective glycaemic control.

Source:https://indianexpress.com/article/health-wellness/yogurt-prediabetes-sugar-9281271/

What happens to your liver when you eat too much sugar?

World Liver Day: Surprisingly, you don't need a diet full of greasy food for fatty liver – too many carbs and sweets, a common issue in India, can be just as detrimental.

We all know that too much sugar can be harmful to our health. It is often associated with diabetes or heart disease. But did you know that excess sugar in diet takes a toll on the liver health too?

What happens to the liver when you eat too much sugar?

The human body has biochemical systems that help interchange protein, starch, and fats — it can turn protein into fat or starch. Whatever food we eat, if it is in excess, it gets stored in the form of fat. Now, sugar and other sweets are starch (carbohydrate) and are broken down into glucose by the body A small percentage of this glucose is used for physical exertion, but most of it is converted into fat. In people who do not do physical exercise and lead a sedentary lifestyle, the rate of becoming fat is higher. Excessive consumption of sugar can lead to weight gain and obesity, but can also affect internal organs like the liver. This is how non-alcoholic fatty liver disease is caused.

Surprisingly, you don't need a diet full of greasy food for fatty liver – too many carbs and sweets, a common issue in India, can be just as detrimental. Sugar consumption also triggers dopamine release, the "feel-good" hormone. People struggling with stress or depression may crave sweets for this dopamine surge. However, most of this sugary comfort food gets stored as fat, eventually harming the liver. This unhealthy cycle can lead to fatty liver disease, cirrhosis (scarring), and even cancer.

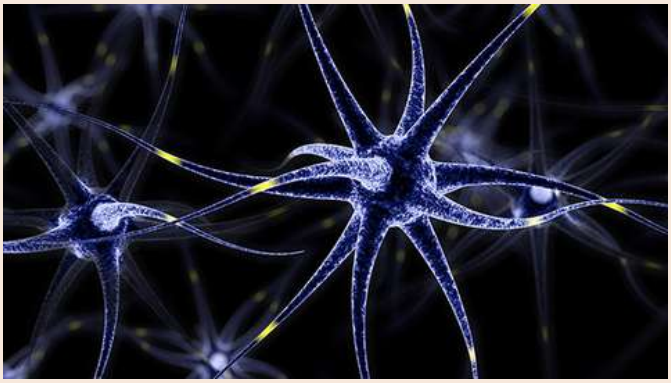
Good bacteria in the intestines are necessary — not only for the smooth functioning of the digestive system but also for your body's general health. Excessive sweetness in the diet affects the habitat of these gut bacteria (Dysbiosis). This alteration in gut bacteria also causes liver dysmetabolism and damage. Free radicals, which cause liver cancer, are also linked to excessive consumption of sugar.

Source:https://indianexpress.com/article/lifestyle/health/world-liver-day-what-happens-too-much-sugar-9278106/

HEALTH

Newfound genetic variant that causes Parkinson's shows a way to beat it.

Scientists discovered a new genetic variant linked to Parkinson's that sheds light on the evolutionary origin of multiple forms of familial parkinsonism, opening doors to better understand and treat the disease.



In the U.S. alone, over a million people are afflicted with Parkinson's, and new cases and overall numbers are steadily increasing

Parkinson's disease is a neurodegenerative movement disorder that progresses relentlessly. It gradually impairs a person's ability to function until they ultimately become immobile and often develop dementia. In the U.S. alone, over a million people are afflicted with Parkinson's, and new cases and overall numbers are steadily increasing.

There is currently no treatment to slow or halt Parkinson's disease. Available drugs don't slow disease progression and can treat only certain symptoms. Medications that work early in the disease, however, such as Levodopa, generally become ineffective over the years, necessitating increased doses that can lead to disabling side effects. Without understanding the fundamental molecular cause of Parkinson's, it's improbable that researchers will be able to develop a medication to stop the disease from steadily worsening in patients.

Many factors may contribute to the development of Parkinson's, both environmental and genetic. Until recently, underlying genetic causes of the disease were unknown. Most cases of Parkinson's aren't inherited but sporadic, and early studies suggested a genetic basis was improbable.

Nevertheless, everything in biology has a genetic foundation. As a geneticist and molecular neuroscientist, I have devoted my career to predicting and preventing Parkinson's disease. In our newly published research, my team and I discovered a new genetic variant linked to Parkinson's that sheds light on the evolutionary origin of multiple forms of familial parkinsonism, opening doors to better understand and treat the disease.

Source:https://www.thehindu.com/sci-tech/science/newfound-genetic-variant-that-causes-parkinsons-shows-a-way-to-beat-it/article68053315.ece

Why onions are a must in your summer salad

Kanika Narang, Dietitian, Indraprastha Apollo Hospitals, New Delhi, explains the science behind traditional diet logic

As the temperature soars and we battle exhaustion and dehydration, it may be a good idea to have sliced onions with our summer salads or meals to beat the heat. Prolonged exposure to high temperature may not only cause heat strokes but can also build cardiovascular stress, particularly in people with pre-existing heart conditions, and disturb our mental health, making us feeling irritable and fatigued. That's why a simple dietary intervention may just be the ticket to good health.

How Onions help you Beat the Heat

Onions have natural cooling properties, making them a valuable addition to summer diets. Their high-water content helps in maintaining hydration. Being rich in sodium and potassium, they help maintain the body's electrolyte balance. They are packed with essential minerals and vitamins, particularly vitamin C, that give you the nutrient push and an immunity boost.

Onions have compounds like quercetin and sulfur which cool the body while stimulating perspiration and allowing heat loss through evaporation. Quercetin fights histamines, which are chemicals that trigger heat allergies like rashes and insect bites.

Onions are rich in phytochemicals such as flavonoids, polyphenols and sulfur compounds like allyl sulfides. These compounds contribute to the onion's antioxidant, anti-inflammatory, antimicrobial and anti-cancer properties. These provide protection against heat-related oxidative stress.

Hot weather means your body has to work harder to keep its core temperature to normal levels. This puts extra stress on your heart, lungs and kidneys. The allyl sulfides in onions have vasodilatory effects, which means they can widen the blood vessels, lowering blood pressure and improving blood circulation.

By activating digestive enzymes, onions prevent indigestion. These are a rich source of fibre and prebiotics, which nourish gut bacteria, which in turn create short chain fatty acids needed for digestion.

Source: https://indianexpress.com/article/health-wellness/can-eating-onions-in-every-meal-help-you-beat-the-heat-9283662/

Join E-discussion: UNOSSC's Global Report on South-South and Triangular Cooperation

The UNOSSC Strategic Framework 2022-2025 calls for the development of a global report on South-South and triangular cooperation. This report will delve into key issues and trends concerning South-South knowledge exchange, technology transfer, and capacity-building. Moreover, it will analyze the role of such cooperation in helping developing countries navigate global transformations like COVID-19 recovery, digitalization, and climate change.

This comprehensive report will serve as a valuable resource for policymakers, development practitioners, and stakeholders. It will provide a robust knowledge base on South-South and triangular cooperation, covering critical topics relevant to scholarly and policy discussions. Furthermore, the report will help inform region and country-specific initiatives by examining their implementation and impact, thereby contributing to expanding policy solutions in these areas.

To ensure the report's relevance, effectiveness, and inclusivity, UNOSSC will adopt a consultative and participatory approach in its preparation with the key stakeholders. To kick off the consultative process, an e-discussion has been launched on the South-South Global Thinkers Network to engage think tanks and research institutions in delineating the report's scope. The discussion aims to elicit insights on the report's scope, gathering a diverse array of perspectives to inform its development. By aligning with the priorities and perspectives of the Global South, this initiative seeks to ensure the report resonates with and addresses the needs of its intended audience.

Source:https://unsouthsouth.org/2024/03/26/join-e-discussion-unosscs-global-report-on-south-south-and-triangular-cooperation/

Ranil Wickremesinghe bats for Global South during Iranian President's visit

Sri Lankan President Ranil Wickremesinghe with his Iranian counterpart Ebrahim Raisi in Colombo.

The Global South must strive for their strength and autonomy, Sri Lankan President Ranil Wickremesinghe said on Wednesday, even as he thanked his Iranian counterpart Ebrahim Raisi, who inaugurated a key power and irrigation project in the island nation.

Expressing "gratitude to Iran for their technical support", Mr. Wickremesinghe emphasised that without Iran's assistance, Sri Lanka would not be able to execute the crucial $514 million irrigation project. Consequent to the project, around 6,000 hectares of agricultural land in three southern and central districts will receive water supply, his office said. Further, the project is expected to generate and add 120 MW to the national grid.

Mr. Wickremesinghe's pitch for greater autonomy for the Global South came amid media reports in Sri Lanka of "Western pressure" on Colombo. Mr. Raisi landed in Sri Lanka ten days after Iran launched an unprecedented missile and drone attack on Israel, retaliating against the April 1 air strike on the Iranian Embassy compound in Damascus. While the two sides appear to have backed off from a regional conflict for now, tensions remain high, with Israel continuing its ceaseless attack on Gaza. During his just concluded three-day visit to Pakistan, President Raisi warned Israel that "nothing will be left of the Zionist regime" if Tel Aviv attacks Iran again.

Meanwhile, the Sri Lankan government announced the signing of five agreements with Iran. Sri Lanka has pledged to expand bilateral ties and development cooperation with the West Asian country and expressed interest in tapping its expertise in the energy, water, agriculture, nanotechnology, pharmaceutical and biotechnology sectors. In February this year, Iranian Foreign Minister Hossein Amir-Abdollahian visited Colombo and expressed satisfaction over the barter trade agreement under which Iran supplies crude oil to Sri Lanka, in return for tea. Iran agreed to offset payment of $250 million for its crude oil, by importing tea from Sri Lanka. The two countries also agreed to explore trading in Asian currencies instead of U.S. dollars.

Source: https://www.thehindu.com/news/international/ranil-wickremesinghe-bats-for-global-south-during-iranian-presidents-visit/article68102850.ece

India-UN Fund: First Phase of Project to Modernize St. Vincent and the Grenadines' Arrowroot Industry Complete

Phase One of a project to modernize St. Vincent and the Grenadines' Arrowroot Industry and provide jobs for indigenous people is now complete. The USD 1.34 million dollar project is being funded by the Government of India under the India-UN Development Partnership Fund.

"The project's aim has been enhance the livelihoods of the indigenous communities involved in the farming and processing of arrowroot with a special focus on creating job opportunities for women," a press release from the Indian High Commission said.

Most of the indigenous communities in St. Vincent and the Grenadines (SVG) are located North of the Rabacca Dry River, the same region in which the new Arrowroot factory is being built. Arrowroot has been a major staple in that region.

Arrowroot (Maranta arundinacea L.) is a tropical herb used for its tubers, which contain a highly valuable starch, according to Feedipedia. It can be used to make cereals and other products.

According to the press release, the project began in 2019 but met with challenges due to the Soufriere volcano eruption on the Island on 9 April 2021.
A Plaque unveiling ceremony was held on 9 April 2024 at the factory site at Orange Hill.

Dr. The Honourable Ralph E. Gonsalves, Prime Minister of St. Vincent & the Grenadines, and Dr. Shankar Balachandran, Ambassador of India to Suriname and concurrently accredited as the non-resident High Commissioner of India to SVG, unveiled the plaque in English and Hindi, commemorating the completion of the first phase of the Arrowroot modernization project at Orange Hills, SVG, according to the press release.

Source:https://unsouthsouth.org/2024/04/12/india-un-fund-first-phase-of-project-to-modernize-st-vincent-and-the-grenadines-arrowroot-industry-is-now-complete/

India-UN Fund: Strengthening Resilience of Local Communities in Togo

As requested by the Government of Togo, India will provide funding support of US $2 million from the India-UN Development Partnership Fund for the project, "Strengthening the resilience of local communities around Fazao-Malfakassa National Park in Togo through promotion of green economy."

The Fazao-Malfakassa National Park in Togo is one of the biodiversity hotspots of Guinean forests in West Africa and is subject to unsustainable exploitation of resources, such as shea, nere, grand deta, Guinea pepper, honey etc. These practices destroy the livelihood base of the communities that depend on them for their survival with very low monetary income. The project aims to reverse trends of resource degradation and increasing poverty through bio-diversity friendly livelihoods. Creation of alternative livelihoods through green economy and income generating activities will benefit 3000 people in 37 villages around Fazao-Malfakassa National Park.

The Permanent Representative of India to the United Nations, Ambassador Ruchira Kamboj said, "India assures its steadfast support to Togo's resilience against environmental and socio-economic challenges." She added, " India is proud to partner with Togo on this important project which is one of Togo Government's national development priorities."

The India-UN Development Partnership Fund, established by Government of India in June 2017, provides support to projects in developing countries that aim to contribute to achieving the Sustainable Development Goals. The Fund adheres to the principles of South-South cooperation and places a priority on national ownership and leadership, equality, sustainability, development of local capacity and mutual benefit. A total of US$ 150 million over the next decade has been committed by Government of India for the Fund which is managed by the UN Office for South-South Cooperation.

Source:https://unsouthsouth.org/2024/04/22/india-un-fund-strengthening-resilience-of-local-communities-in-togo/

Youth Leadership at the Core of Greening Technology Transfer in the Global South

Following the launch of the pilot project "Greening Higher Education: Promoting the Role of Science, Technology, and Innovation in SDG Impacts through Meaningful Youth Engagement and Leadership among the South-South University Cooperation Network" by UNESCO International Institute for Higher Education (UNESCO IESALC) and the United Nations Office of South-South Cooperation (UNOSSC) at COP28 in Dubai in December 2023, the two UN offices have joined hands once again. During the United Nations Economic and Social Council (ECOSOC) Youth Forum UNESCO IESALC and UNOSSC organized a partnership discussion, bringing together youth leaders from various regions and stakeholders who have taken actions in the space of Greening Higher Education and committed to continue working with the UN in the realization of SDG4 on Education and SDG 13 on climate change through strong partnerships. While co-hosted by UNESCO IESALC and UNOSSC, UNESCO SDG4 Youth & Student Network, UNICEF, National Geographic Learning, University of Helsinki, Education Above All and Technological University Dublin supported the event as partners.

The event "Greening Higher Education Institutions: bridging SDG4 and SDG 13" provided education stakeholders and communities with the knowledge to drive a green transformation in higher education. Harnessing the resources of higher education institutions and cooperating with partners in different sectors is critical to achieving this objective successfully. Furthermore, the shift to a sustainable society requires the incorporation of green concepts into science, technology, and innovation (STI), including the value and promotion of youth led projects for green STI aimed at a sustainable future. It also stressed the essential role that higher education, especially through young people's leadership and engagement, should play in fostering a sustainable and environmentally conscious society, building the basis for a better tomorrow for today's and future generations.

Source:https://unsouthsouth.org/2024/04/18/youth-leadership-at-the-core-of-greening-technology-transfer-in-the-global-south/

IsDB: 50 Years of Championing South-South Cooperation in its Member Countries and Beyond

As we pass the midpoint of the implementation of the 2030 Agenda, the world is falling short of meeting most of the Sustainable Development Goals. Nearly 40 per cent of all developing countries suffer from severe debt problems.

Responding to the priorities of the Global South since its establishment in 1974, the Islamic Development Bank (IsDB) has been providing innovative, sustainable and predictable development financing, said UNOSSC Director Ms. Dima Al-Khatib, during a discussion highlighting IsDB's 50 years of championing South-South cooperation in its Member Countries and beyond. The discussion was held alongside the IsDB 2024 Annual Meetings and Golden Jubilee celebrations in Riyadh.

The importance of scaling up innovative development finance is reflected in various recent international foras and respective agreements, including the 21st Session of the High-Level Committee on South-South Cooperation; the Science, Technology, and Innovation (STI) Summit; and the Third South Summit, among others. Here it is important to note that Member States emphasize that Southern-led development finance provides essential support to developing countries in the implementation of their sustainable development agendas, adapted to their specific domestic conditions.

During the IsDB discussion, panelists exchanged views and ideas on the various ways and means to scale up South-South cooperation, emphasizing the huge potential of South-South cooperation to assist the countries from the Global South to achieve the sustainable development goals, among internationally agreed development goals.

Source:https://unsouthsouth.org/2024/04/30/isdb-50-years-of-championing-south-south-cooperation-in-its-member-countries-and-beyond/

OTHERS

Why do we shiver when it is cold?

Shivering (physical thermogenesis) occurs when the tension of the skeletal muscles rises beyond a critical level or when the body temperature falls below the critical level of 37.1 degrees C.

Shivering is actually an involuntary contraction of muscles to maintain body temperature during fever and in cool environments. It involves oscillating skeletal-muscle contractions that occur at 10-20 per second. The movement is at first irregular, then assumes quick involuntary movements during which small groups of muscles contract asynchronously. Due to the asynchronous movement, they do not move the parts associated with them in a coordinated manner.

The posterior hypothalamus region in the brain harbours the primary motor centre responsible for shivering. When the body temperature falls below 37.1 degrees C, the skin sends cold signals to the spinal cord. These are picked up by the hypothalamus, which takes advantage of the fact that increased skeletal-muscle activity generates heat. Acting through descending pathways that terminate on the motor neurons controlling the body's skeletal muscles, the hypothalamus gradually increases skeletal-muscle tone (constant level of tension within muscles).

Thus shivering begins throughout the body when the tension of the skeletal muscles rises beyond the critical level, producing heat and increasing the temperature of the body within a matter of seconds. Studies reveal that shivering may produce as much as 42.5 cal/hr, almost seven times greater than man's normal resting metabolism at room temperature. In a resting person, most body heat is produced by the thoracic and abdominal organs due to ongoing metabolic activities.

Generally, shivering is seen only in birds and mammals.

Source:https://www.thehindu.com/sci-tech/science/why-do-we-shiver-when-it-is-cold/article68124522.ece

A wild orangutan used a medicinal plant to treat a wound, scientists say

Researchers say an orangutan appeared to treat a wound with medicine from a tropical plant

A male Sumatran orangutan named Rakus, with a facial wound below the right eye, is seen in the Suaq Balimbing research site, a protected rainforest area in Indonesia, two days before the orangutan administered wound self-treatment using a medicinal plant, in this handout picture taken June 23, 2022.

An orangutan appeared to treat a wound with medicine from a tropical plant— the latest example of how some animals attempt to soothe their own ills with remedies found in the wild, scientists reported on 2nd May 2024.

Scientists observed Rakus pluck and chew up leaves of a medicinal plant used by people throughout Southeast Asia to treat pain and inflammation. The adult male orangutan then used his fingers to apply the plant juices to an injury on the right cheek. Afterward, he pressed the chewed plant to cover the open wound like a makeshift bandage, according to a new study in Scientific Reports.

Previous research has documented several species of great apes foraging for medicines in forests to heal themselves, but scientists hadn't yet seen an animal treat itself in this way.

"This is the first time that we have observed a wild animal applying a quite potent medicinal plant directly to a wound," said co-author Isabelle Laumer, a biologist at the Max Planck Institute of Animal Behavior in Konstanz, Germany.

The orangutan's intriguing behavior was recorded in 2022 by Ulil Azhari, a co-author and field researcher at the Suaq Project in Medan, Indonesia. Photographs show the animal's wound closed within a month without any problems.

Scientists have been observing orangutans in Indonesia's Gunung Leuser National Park since 1994, but they hadn't previously seen this behavior. "It's a single observation," said Emory University biologist Jacobus de Roode, who was not involved in the study. "But often we learn about new behaviors by starting with a single observation." "Very likely it's self-medication," said de Roode, adding that the orangutan applied the plant only to the wound and no other body part.

Source:https://www.thehindu.com/sci-tech/science/a-wild-orangutan-used-a-medicinal-plant-to-treat-a-wound-scientists-say/article68134786.ece