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SCIENCE & TECHNOLOGY

Rethinking Shoe sizes

When the shoe does not fit, it's time to rethink size measures! And that's what is happening in India. There may soon be a new sizing system called 'Bha' to measure footwear for Indians

When the shoe does not fit, it's time to rethink size measures! And that's what is happening in India. There may soon be a new sizing system called 'Bha' to measure footwear for Indians. Currently Indians use Europeans standards to gauge sizes. The need for a local system for shoe sizes has arisen given the differences in the Indian population's foot shape and size.

Indian feet are flatter and wider. This was uncovered by a study conducted by The CSIR-Central Leather Research Institute (CLRI) that surveyed over a lakh of people in 79 locations on the size, structure and dimension of an average Indian Foot. The survey found that most Indians wear a size larger since European footwear measures are narrower. The proposed 'Bha' system — that is likely to be out by 2025 — is being spearheaded by the Department of Promotion of Industry and Internal Trade (DPIIT) and the Bureau of Indian Standards (BIS). The expectation is that Indians will get better fitting footwear with the 'Bha' sizing.

Source:https://www.thehindubusinessline.com/catalyst/rethinking-sizes/article68117527.ece

Garlic-Based Nanomaterials to Fight Drug-Resistant Infections

Key Findings

- Researchers at Imam Abdulrahman Bin Faisal University created a nanocomposite using garlic and a metal-organic framework (ZIF-8)
- The nanocomposite showed strong antibacterial and antifungal properties, especially against Candida species
- This innovative approach could help treat drug-resistant infections by enhancing the natural antimicrobial properties of garlic

Green nanotechnology is an expanding field that offers innovative nanoparticle drug formulations with enhanced bioactivity. In a recent study by researchers at Imam Abdulrahman Bin Faisal University, a mesoporous metal-organic framework (ZIF-8) was synthesized using the herb Allium sativum (garlic) to create a nanocomposite with significant antibacterial and anti-fungal properties.

The study focused on the synthesis and characterization of the ZIF-8 nanocomposite. Techniques such as X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), scanning coupled with energy-dispersive X-ray spectroscopy (SEM-EDX), and transmission electron microscopy (TEM) confirmed the successful formation of the nanocomposite. The structural integrity of ZIF-8 was maintained when combined with A. sativum, ensuring the composite's efficacy.

The antimicrobial activity of the nanocomposite was tested against Shigella flexneri, Candida albicans, and Candida parapsilosis. The results showed that the nanocomposite had a potent effect against both the bacteria and the Candida species, with a more pronounced antifungal action compared to its antibacterial effects. This suggests that the nanocomposite could be particularly useful in treating fungal infections, which are increasingly problematic due to rising drug resistance

Source:https://naturalsciencenews.com/article/2386

'Mother of the forests': What a new study found about the origin of Madagascar's baobab trees

Endemic to Madagascar, Africa and Australia, the baobab trees appear unique due to their wide trunks and spindly branches. What might be their source of origin and what threats do they face?

A new study has uncovered the origins of Baobabs, the tall and uniquely shaped deciduous trees which are famously spotted on the island of Madagascar. Also known as the "mother of the forest", other species of these trees are native to Africa and Australia.

The study ('The rise of baobab trees in Madagascar') from researchers in the UK, China and Africa was published in Nature on Wednesday (May 15). Here is what it found about the evolution and spread of these trees and the dangers they face now.

First, what are baobab trees?

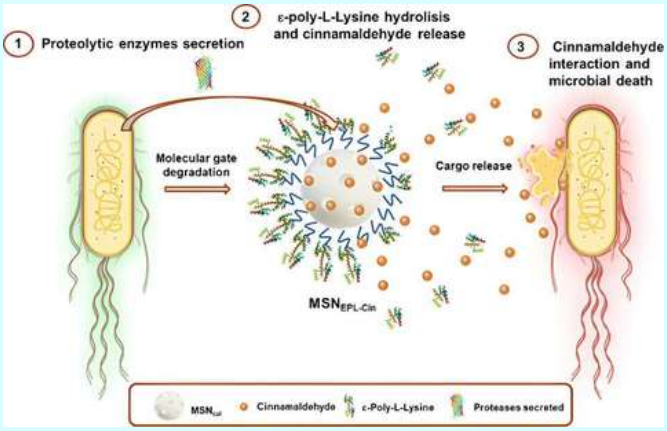
Baobabs are known for their great heights, with some extending up to 50 metres, and being exceptionally long lifespans going up to 2,000 years. In India too, a few baobab trees exist, including one near the Golconda Fort in Andhra Pradesh that is believed to be more than 400 years old.

The trees have trunks with large circumferences and thin, spindly branches. In local cultures, the trees are also revered because of the multiple uses their parts have, with the fruits and seeds being edible, the seed oil used for cooking and the bark fibre for clothing.

They are also called "upside down" trees because their tops resemble an uprooted plant turned upside down. Many legends surround the nickname, including an Arab one that says "The devil plucked up the tree and thrust the branches into the soil and left the roots in the air." ('The Baobabs: Pachycauls of Africa, Madagascar and Australia' by Gerald E Wickens and Pat Lowe')

Source:https://indianexpress.com/article/explained/explained-sci-tech/new-study-madagascar-baobab-trees-9335698/

Team develops an intelligent nanodevice based on a component of cinnamon essential oil as an antimicrobial agent



A team of researchers from the Universitat Politècnica de València (UPV) and the CIBER de Bioingeniería, Biomaterials y Nanomedicine (CIBER-BBN) has developed an intelligent "nanokiller" based on a component of cinnamon essential oil (cinnamaldehyde) for use as an antimicrobial agent.

The results of this work have been published in the journal Biomaterials Advances.

So far, the new nanodevice has shown significant efficacy against pathogenic microorganisms such as Escherichia coli, Staphylococcus aureus, and Candida albicans. It could be applied for the elimination of pathogens that may be present in food, wastewater and the treatment of nosocomial infections, which are those acquired during hospital stays.

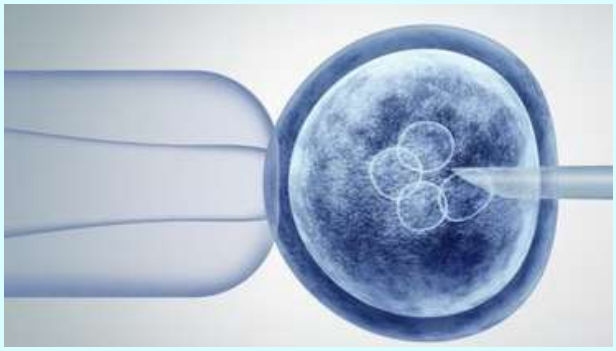
In the case of Escherichia coli, most strains are harmless, although some can cause severe abdominal cramping or acute diarrhoea and vomiting. In the case of Staphylococcus aureus bacteria, its effects can be skin infections, bloodstream infections, osteomyelitis, or pneumonia. Meanwhile, Candida albicans is a fungus found in different biological fluids, causing diseases such as candidemia or invasive candidiasis.

According to the team of the IDM-CIBER NanoSens group, applying this nanokiller would be very simple. "For example, we could create a spray, make a formulation based on water and other compounds, and apply it directly. We could make a water-based formulation in the field and spray it directly, like any pesticide today. And in hospitals, it could be applied to bandages, and we could even try to make a capsule that could be taken orally," explains Andrea Bernardos, a researcher in the NanoSens group at the Inter-University Institute for Molecular Recognition Research and Technological Development (IDM).

Source:https://phys.org/news/2024-05-team-intelligent-nanodevice-based-component.html#:~:text=A%20team%20of%20researchers%20from,use%20as%20an%20antimicrobial%20agent.

How a CRISPR gene editing trial was able to treat some cases of inherited blindness

Researchers have used a CRISPR-Cas9 tool to restore vision in a group of adults and children with congenital blindness.



A new CRISPR gene editing called EDIT-101 has successfully restored vision in some patients with congenital blindness

Scientists have said they used a human gene editing tool, CRISPR-Cas9, to restore vision in people with a rare form of inherited or congenital blindness.

The researchers said 11 out of the 14 people in a clinical trial experienced improved vision, without serious adverse side effects.

They said the study was also the first to use gene therapy to treat children who had been born with a form of blindness. Eric Pierce of Harvard Medical School, who led the study, said participants were “thrilled” to be able to see the food on their plates.

“These were individuals who could not read any lines on an eye chart and who had no treatment options, which is the unfortunate reality for most people with inherited retinal disorders,” Pierce said in a statement. The findings were published in The New England Journal of Medicine on May 6, 2024.

CRISPR gene editing brings ‘BRILLIANCE’

The trial was called “BRILLIANCE” and 12 adults and two children, who had a rare form of inherited blindness, known as Leber congenital amaurosis (LCA), participated in it.

LCA affects about one in 40,000 people and causes severe vision loss at an early age. This blindness is caused by a gene mutation that prevents a protein from functioning properly. That protein — CEP290 — is critical for sight.

Participants in the study received a single dose of a CRISPR gene therapy called EDIT-101.

Source:https://indianexpress.com/article/explained/explained-sci-tech/crispr-gene-editing-blindness-research-9314245/

ENVIRONMENT

What is carbon farming?

What are some techniques within carbon farming which can reduce greenhouse gas emissions? What are the challenges in implementing such techniques, especially in developing countries such as India? What are some of the global initiatives?

A worker loads fertilizer into a tank attached to a large drone, preparing to spray it rice fields in Long An province in southern Vietnam's Mekong Delta, on January 2

Carbon is found in all living organisms and many minerals. It is fundamental to life on earth and plays a crucial role in various processes, including photosynthesis, respiration, and the carbon cycle. Farming is the practice of cultivating land, raising crops, and/or livestock for food, fibre, fuel, or other resources. It encompasses a wide range of activities, from planting and harvesting crops to managing livestock and maintaining agricultural infrastructure.

Carbon farming combines these two concepts by implementing regenerative agricultural practices that restore ecosystem health while improving agricultural productivity and soil health, and mitigating climate change by enhancing carbon storage in agricultural landscapes and reducing greenhouse gas emissions. The practice is easy to adopt across various agro-climatic zones. It can also help ameliorate soil degradation, water scarcity, and challenges related to climate variability.

How can carbon farming help?

A simple implementation of carbon farming is rotational grazing. Others include agroforestry, conservation agriculture, integrated nutrient management, agro-ecology, livestock management, and land restoration.

Agroforestry practices — including silvopasture and alley cropping — can further diversify farm income by sequestering carbon in trees and shrubs. Conservation agriculture techniques such as zero tillage, crop rotation, cover cropping, and crop residue management (stubble retention and composting) can help minimise soil disturbance and enhance organic content, particularly in places with other intense agricultural activities.

Source: https://www.thehindu.com/sci-tech/energy-and-environment/what-is-carbon-farming-explained/article68147027.ece

New plant species discovered from Edamalayar forest range

The species Emblica chakrabartyi belongs to the gooseberry family. Scientists found a population of around 55 plants during an expedition as part of a UGC-sponsored research project

Emblica chakrabartyi, the new plant species discovered from the Edamalayar forest range of Kerala

Scientists from SNM College Maliankara, Ernakulam, National Botanical Research Institute, Lucknow, and King Fahd University, UAE, have reported the discovery of a new plant species Emblica chakrabartyi from Adichilthotti within the Edamalayar forest range of Kerala. The species belonging to the gooseberry (Phyllanthaceae) family, has been named after Tapas Chakrabarty, former scientist at the Botanical Survey of India, for his contribution to the study on Phyllanthaceae. The finding has been published in John Wiley & Sons' International Journal, Nordic Journal of Botany, from Sweden.

The scientists found a population of around 55 plants in and around the Edamalayar and nearby Sholayar forest areas during an expedition as part of a UGC-sponsored major research project on the flowering plants of Ernakulam district.

Plant's features

The plant attains a height of approximately 2 metres. The leaves are large with a shiny elongated oval shape of up to 13 cm. The flowering and fruiting occur during December to June. Male flowers are found in inflorescence whereas females ones are in single, on the leaf axils. Each flower bears yellowish green coloured six petals. The fruits are brown to black when they ripen and the seeds are black about 8-9 mm diameter.

Generally growing as shrubs in tropical rain forests, 55 species of the genus Emblica have been recorded all around the world. The new plant is the eleventh from India.

Source:https://www.thehindu.com/news/national/kerala/new-plant-species-discovered-from-edamalayar-forest-range/article68196865.ece

ENVIRONMENT

Human-induced environmental changes are spiking the risk of disease outbreaks: What a new study says

Biodiversity loss, which refers to the loss of plant or animal species at a local or worldwide scale, has the biggest impact, according to the study. It was followed by climate change and introduction of non-native species.

As human activities continue to degrade the planet, the risk of infectious disease outbreaks is increasingly becoming more likely. Four human-induced global changes — biodiversity loss, introduction of non-native species, climate change, and chemical pollution — are the leading drivers of disease spread not just among humans but also among plants and animals, according to a new study.

The research, 'A meta-analysis on global change drivers and the risk of infectious disease', published in the journal Nature earlier this month, has been carried out by a team of 20 researchers from US-based universities such as the University of Notre Dame, Yale University, Oregon State University, and the University of Connecticut.

Previous studies have also highlighted the link between disease spread and environmental changes but their approach was much more targeted. For example, a 2023 study found that warmer temperatures could be leading to a wider spread of malaria in Africa. The latest study has found that these changes are influencing infectious disease risk across the world and species.

What are the findings of the study?

Although the spread of diseases can be influenced by a variety of factors, the researchers focused on five key global change drivers — biodiversity loss, climate change, chemical pollution, non-native species, and habitat loss.

Source:https://indianexpress.com/article/explained/explained-climate/environmental-changes-risk-disease-outbreaks-9342346/

Why are Lakshadweep coral reefs undergoing severe bleaching?

Bleaching leaves corals exposed to disease and starvation, and has major consequences for their long term health.

Bleached corals in Lakhshadweep (Credit: CMFRI)

The ICAR-Central Marine Fisheries Research Institute (CMFRI) has found that coral reefs in the Lakshadweep Sea have undergone severe bleaching due to prolonged marine heatwaves since October 2023.

According to Dr R K Sreenath and Dr Shelton Padua, senior scientists at the CMFRI heading the research, coral bleaching threatens Lakshwadeep's diverse marine ecosystems. Here is what you need to know about coral bleaching, why it takes place, and its impacts.

What are coral reefs?

Corals are sessile animals, i.e. they permanently attach themselves to the ocean floor. They are classified as either 'hard' or 'soft'. According to the United States' National Oceanic and Atmospheric Administration, "Hard corals have stony skeletons made out of limestone that are produced by coral polyps. When polyps die, their skeletons are left behind and used as foundations for new polyps."

Over thousands and millions of years, these stonily coral skeletons have formed complex coral reefs, which have often been referred to as "rainforests of the sea" — home to thousands of marine species, and vibrant ecosystems.

Almost all of Lakshadweep's islands are coral atolls, with their soil largely derived from corals, and extant coral reefs around them.

Source:https://indianexpress.com/article/explained/explained-climate/lakshadweep-coral-reefs-undergoing-severe-bleaching-9311488/

Moment in the sun: Kerala's Thattekkad Bird Sanctuary prepares for a high-flying summer

Despite the scorching heat, Thattekkad Bird Sanctuary prepares for a high-flying summer with an impressive show of over 200 species of regional birds

Entrance of the Thattekkad Bird Sanctuary in Kerala; a Common kingfisher photographed at the sanctuary

Just an hour into the self-guided Salim Ali Nature Trail at the Thattekkad Bird Sanctuary, you feel the sunburn from the scorching heat. The foliage on the footpath is thick and green, the Periyar lake stands still as the sun pierces through the windless sky. Only the cacophony of the wild mynas, orioles, and the occasionally-passing tourist keeps you company. You even wish you had paid more attention to how quickly you finished two litres of water. And yet, if you are an avid birder, it is impossible not to smile as you realise what Dr. Salim Ali, the Birdman of India, meant when he called the Thattekkad region "the richest bird habitat in peninsular India, comparable only with the eastern Himalayas."

Thattekkad Bird Sanctuary is a haven for birds. "You should have come in November or started early today. It does get a bit too hot these days," says a smiling Sudha Chandran a.k.a Sudhamma, the famous guide at the sanctuary. For over two decades she has seen tourists and birders struggle with the heat.

Situated in Ernakulam district, about 12 kilometres from Kothamangalam, Thattekkad is one of India's most popular bird sanctuaries. One of the unique aspects of this 25 sq. km region is that even during the monsoon, there is no shortage of regional birds — more than 200 species in number, and the flow of visitors.

Thattekkad is one of the rare sanctuaries that attracts birds of local migration and tourists even during the fiery months of April and May. "That is why it's too early to ascertain how this season has fared when it comes to tourists. People in search of migratory birds may not come, but local tourists and tourists from other states come in these months as well," says Ouseph, Assistant Wildlife Warden at Thattekad.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/moment-in-the-sun-keralas-thattekkad-bird-sanctuary-prepares-for-a-high-flying-summer/article68091034.ece

Forest conservation, management in India advanced over last 15 years: India informs UNFF

Globally, India ranks third in the net gain in average annual forest area between 2010 and 2020

India said it has given priority to biodiversity and wildlife conservation

India informed the United Nations Forum on Forests (UNFF) that it has made significant advancements in forest conservation and management, leading to a consistent increase in forest cover over the past 15 years. The country participated in the 19th Session of the UNFF held at the UN headquarters in New York from May 6 to 10.

Globally, India ranks third in the net gain in average annual forest area between 2010 and 2020.

During the session, India said it has given priority to biodiversity and wildlife conservation, having expanded the network of protected areas to over a thousand wildlife sanctuaries, national parks, tiger reserves, biosphere reserves, and other wildlife habitats.

India's commitment to conservation

The recent celebrations marking 50 years of 'Project Tiger' and 30 years of 'Project Elephant' underscore India's commitment to species conservation and habitat protection, the Environment Ministry said in a statement.

India also highlighted the creation of the International Big Cat Alliance, a global initiative aimed at protecting and conserving the seven big cat species worldwide through collaborative efforts. The country also informed the UNFF about the introduction of the 'Green Credit Program', a market-based mechanism rewarding voluntary environmental actions by individuals, communities, and the private sector.

Source: https://www.thehindu.com/sci-tech/energy-and-environment/forest-conservation-management-in-india-advanced-over-last-15-years-india-informs-unff/article68167705.ece

Genetic traits of wild species make chickpea improvement possible: Study

The genomic resources and unique genes presented in distant relatives of modern-day chickpeas in this new study will greatly benefit chickpea breeding and the advancement of the research community

A new collaborative research study from Murdoch University (Australia) and ICRISAT (India) has revealed the potential of using wild crop relatives for chickpea improvement, paving the way for more advanced crops and greater global food security.

The study 'Cicer super-pangenome provides insights into species evolution and agronomic trait loci for crop improvement in chickpea', published in Nature Genetics, provides insights into the evolutionary history and divergence time of the Cicer genus, sequencing the genomes of eight wild Cicer species and comparing them with two cultivated chickpea varieties.

The study also constructs a graph-based super-pangenome that can help identify and transfer valuable genes from wild species to cultivated ones.

Director of Murdoch University's Centre for Crop and Food Innovation Professor Rajeev Varshney, who coined the term 'super-pangenome' in 2019 in Trends in Plant Science, said the findings in the new study could accelerate crop improvement globally.

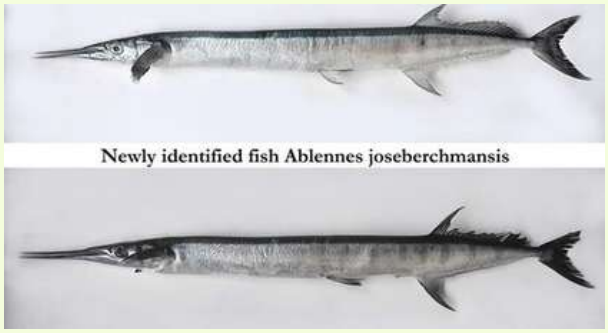
"The genomic resources and unique genes presented in distant relatives of modern-day chickpeas in this new study will greatly benefit chickpea breeding and the advancement of the research community in this area in Australia and globally," Professor Varshney said.

"The Cicer super-pangenome offers a powerful way to study chickpea genes to perform association analyses and determine the most important traits for our farming industry," Professor Varshney said.

"Our study found that the wild species have more genetic diversity and variations that could be useful for improving chickpea traits such as disease resistance, flowering time, and stress tolerance.

Source:https://agriculturepost.com/agri-research/genetic-traits-of-wild-species-make-chickpea-improvement-possible-study/

ICAR-CMFRI identifies two new species of needlefish from Indian waters



Newly identified fish Ablennes joseberchmansis

The analysis confirmed that these newly identified species have unique characteristics. New fishes were scientifically named as Ablennes joseberchmansis and Ablennes gracalii

Adding two more fishes to the Indian marine biodiversity, researchers at the ICAR-Central Marine Fisheries Research Institute (CMFRI) have scientifically described two new species of needlefish from Indian waters. They found out that the previously identified flat needlefish (Ablennes hians) is a complex of at least three distinct species.

Genetic and molecular analysis, coupled with taxonomic examination, confirmed that these newly identified species have unique characteristics. New fishes were scientifically named as Ablennes joseberchmansis and Ablennes gracalii.

The research was carried out by Toji Thomas, a research scholar at CMFRI, under the guidance of Dr. EM Abdussamad, Principal Scientist.

The study focused on specimens collected from Thoothukudi, Tamil Nadu. These commercially valuable fishes are known for their palatability and nutritional content. Primarily caught using hook-and-line methods, they are identifiable by their green spines and elongated beaks with sharp teeth. Their market price is around 400 rupees per kilogramme.

Found abundantly along the Indian coast, these fishes are pelagic resources and are available for fishing in the upper water column (0-20 metres deep). According to CMFRI, further research is needed to understand the distribution and population patterns of the newly identified fishes in Indian waters. Given their high demand, the researchers believe these fish have the potential to benefit the country's marine fisheries sector.

Source:https://agriculturepost.com/agri-research/icar-cmfri-identifies-two-new-species-of-needlefish-from-indian-waters/

AGRICULTURE

Tequila Bacteria Boosts Tomato Health and Soil Life Against Disease

Key Findings

- In India, a study found that B. tequilensis PBE-1 bacteria protect tomatoes from Fusarium wilt
- Treated plants showed stronger defenses and maintained better overall health
- The beneficial soil microbes around the plants remained healthy after treatment.

Tomatoes are a staple in diets worldwide, but they face a formidable foe in Fusarium wilt disease, caused by the soilborne pathogen Fusarium oxysporum. This disease not only wreaks havoc on tomato plants but can also affect over 100 other plant species and even pose risks to human health in immune-compromised patients[2]. Researchers at the CSIR-National Botanical Research Institute have made a significant breakthrough in the fight against this disease. Their recent study provides hope for a sustainable solution to protect tomatoes and potentially other crops from the destructive pathogen.

The study focuses on a biological control agent, Bacillus tequilensis PBE-1, and its effects on tomato plants and soil microflora when under attack from Fusarium wilt. B. tequilensis PBE-1 is a type of beneficial bacteria that can help plants resist diseases. The researchers found that treating tomato plants with PBE-1 led to increased lignin deposition in the plants' cells, which serves as a barrier against the invading pathogen, thereby reducing cellular damage.

Metabolite profiling, which involves analyzing the chemical fingerprints that specific cellular processes leave behind, revealed that PBE-1 treatment helped alleviate the stress caused by F. oxysporum infection. This was evidenced by the improved transpiration, photosynthesis, and stomatal conductance in the tomato plants. Essentially, the plants could breathe, produce energy, and regulate water more effectively when treated with PBE-1.

Source: https://naturalsciencenews.com/article/1680

The happy, hopeful coffee farmers of Karnataka

The soaring prices of coffee beans, driven by a global shortage in crop production, have provided a ray of hope for growers in Karnataka, which produces most of India's coffee. Planters tell The Hindu that while this is good, the more significant problems remain

Coffee plantation workers planting saplings in Chikkamagaluru district.

Sanketh Appaiah, a young coffee planter in a village near Madikeri in north Kodagu, is now the proud owner of a new SUV thanks to the rising prices of coffee over the past three months. The 42-year-old is happily driving his new vehicle across the hilly terrain of the small district in south Karnataka.

The soaring prices of coffee beans, driven by a global shortage in crop production, have provided a ray of hope for coffee growers in Karnataka, which is the highest coffee-growing State in India. Currently, at a 15-year high, these prices are a boon for growers who have weathered a tumultuous decade.

"I own an 8-acre Robusta coffee plantation. For the first time in 15 years, the coffee price has increased, helping me to fulfil my plan of buying a new SUV this year," said a visibly thrilled Appaiah. Like him, many coffee planters who are experiencing good prices after a decade are investing in various assets, such as plots of land, apartments, houses, and new vehicles.
A prominent cooperative bank in Kodagu received around 800 applications in a single day for vehicle loans in April. Speaking on the condition of anonymity, the bank manager said, "We have never seen so many people applying for vehicle loans. This trend can be attributed to the increase in crop prices. At the same time, we are also noticing that farmers are repaying their loans on time this year, which is also due to the increase in coffee prices." Karnataka contributes 71% to the total production of coffee in India, followed by Kerala at 21% and Tamil Nadu at 5%.

Source:https://www.thehindu.com/sci-tech/agriculture/the-happy-hopeful-coffee-farmers-of-karnataka/article68177648.ece

HEALTH

General, central obesities linked to higher risk of colorectal cancer

Data from the study can be used to develop new screening tools for colorectal cancer in future, experts say

Obesity is generally defined with the body mass index, which doesn't say anything about how fat is distributed in the body.

Obesity rates are rising worldwide. In India, a 2022 study in The Lancet estimated the percentage of obese women and men to be 9.8% and 5.4% respectively. Along with higher risk of heart disease and diabetes, obesity has been linked to a higher susceptibility to colorectal cancer (CRC), among others.

CRC refers to cancers of the colon or the rectum. The CRC incidence is relatively low in India, but the percentage of people who are alive five years after a CRC diagnosis is reportedly under 40% — one of the lowest in the world. According to a 2017 study in the Indian Journal of Surgical Oncology, CRC patients in India are generally young and present more frequently with advanced stages of the disease.

Not all are equal

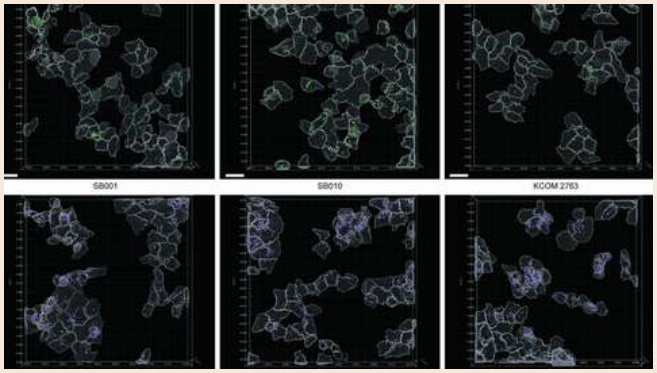
While researchers have known that obese individuals have a higher risk of CRC, a Science Advances study published in April 2024 reported evidence that not all obese people are at equal risk. Instead, the risk seems to be higher for those who are "generally obese" and those who are "tall [and] centrally obese".

The study argued that different genetic pathways may explain how CRC is caused in different obesity subtypes.
"The study highlights the importance of considering body shapes as compared to BMI for risk assessment" of CRC," Dhruvi Shah, a doctoral candidate at the University of Bonn studying the association between obesity and influenza, said. Ms. Shah has studied the relationship between obesity and pancreatic cancer.

Source:https://www.thehindu.com/sci-tech/science/general-central-obesities-linked-to-higher-risk-of-colorectal-cancer/article68178225.ece#:~:text=In%20India%2C%20a%202022%20study,the%20colon%20or%20the%20rectum.

A mouth bacteria has starring role in colorectal cancer, study finds

Experts said the study's findings could be used to develop tests to detect colorectal cancer early and develop targeted therapies



The bacteria known as Fusobacterium nucleatum live in the human mouth and are rarely found elsewhere. But in cases of cancer of the colon or the rectum, the bacteria are found in tumours in the gut, where they help cancer cells escape from the immune system and spread to other parts of the body.

In a new study, a group of researchers from the Fred Hutchinson Cancer Center in the U.S. has identified a distinct subtype of the bacterium that's found in relatively greater quantities in colorectal cancer (CRC) tumours.

CRC is the seventh most common type of cancer in India, where the number of cases rose by 20% from 2004 to 2014. Worldwide, the overall CRC incidence has declined but, experts wrote in the journal Science last year, the incidence of age-adjusted early-onset CRC "has risen at an alarming rate of 2-4% in many countries, with even sharper increases in individuals younger than 30 years."

According to the team's experiments, described in a paper in Naturein March, some genetic factors could be boosting Fusobacterium's ability to associate with cancers of the gut. The team also showed that when mice were infected with this type of Fusobacterium, their intestines developed precancerous formations called adenomas.

Experts said the study's findings could be used in future to develop tests to detect CRC early and develop targeted treatment options.

Source:https://www.thehindu.com/sci-tech/science/a-mouth-bacteria-has-starring-role-in-colorectal-cancer-study-finds/article68145511.ece

HEALTH

Balancing two forms of SNCA protein could help manage Parkinson's, study finds

Many Parkinson's disease researchers are focused on reducing the prevalence of SNCA proteins in neurons as a therapeutic measure

A protein called synuclein alpha is notorious for its involvement in age-related neurodegenerative diseases.

Synuclein alpha (SNCA) is a mysterious protein. It's present in healthy cells but we don't know what it does there. It is notorious for its involvement in age-related neurodegenerative diseases. Twenty-seven years ago, researchers first associated SNCA with Parkinson's disease. People with this disease lose neurons that communicate with each other using dopamine as a neurotransmitter in a part of their brains.

These dopaminergic neurons have been found to contain aggregated masses of proteins called Lewy bodies. Most of these proteins are SNCA.

Since then, researchers have reported SNCA in similar aggregates in the brains of people with other neurodegenerative diseases as well. But its presence is most prominent in brains with Parkinson's.

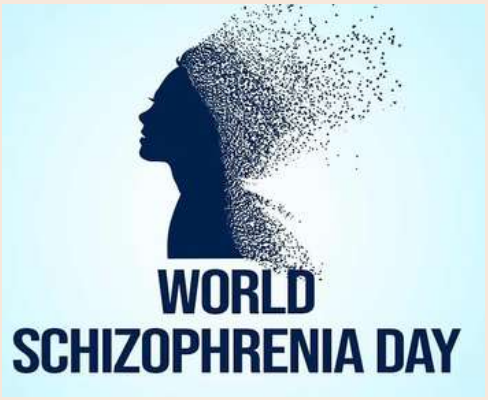
SNCA is abundant in neurons, especially in dopaminergic neurons. It is found near the nuclei of these cells and at the junctions between two neurons. It's capable of misfolding as well as forming filamentous structures. So unlike most other proteins, which take up predictable three-dimensional structures, SNCA can fold in multiple ways. Misfolded proteins don't function correctly.

But beyond these observations, researchers don't understand the dynamics of the formation of these aggregates and how exactly they affect neurons.

Source:https://www.thehindu.com/sci-tech/science/balancing-two-forms-of-snca-protein-could-help-manage-parkinsons-study-finds/article68192998.ece#:~:text=Dr.%20Raychaudhuri%20has%20suggested%20balancing,is%20still%20being%20worked%20out.

World Schizophrenia Day 2024: Know the Causes, Symptoms, Diagnosis & Treatment

On this World Schizophrenia Day 2024, know the causes, symptoms, diagnosis, and treatment of Schizophrenia



Schizophrenia is a serious mental health condition that affects how people think, feel and behave. It results in a mix of hallucinations, delusions, and disorganized thinking and behavior. Hallucinations involve seeing things or hearing voices that aren't observed by others. Delusions involve firm beliefs about things that are not true. People with schizophrenia seem to lose touch with reality, making their lives very hard.

People with schizophrenia need lifelong treatment. This includes medicine, talk therapy and learning how to manage daily life activities. People who have psychosis that is not treated tend to have more severe symptoms, more stays in a hospital, poorer thinking and processing skills and social outcomes, injuries, and even death. Let's have a look at the causes, symptoms, diagnosis and treatment of Schizophrenia.

Schizophrenia: Causes

The exact cause of schizophrenia is unknown. Medical researchers believe several factors contribute which include :

- Biological
- Genetic
- Environmental

It is suggested that imaging tests completed on people with schizophrenia shows abnormalities in certain brain structures.

Even though it is not known what causes schizophrenia, but it is believed genetics play a role. People with a family history of schizophrenia have a higher risk of developing this disorder.

Source:https://www.thequint.com/fit/world-schizophrenia-day-2024-know-the-causes-symptoms-diagnosis-treatment#read-more

HEALTH

Avoid protein supplements: top medical body in dietary guidelines for Indians

The ICMR recommended restricting salt intake, minimising sugar and ultra-processed foods

The Hyderabad-based National Institute of Nutrition has released revised 'Dietary Guidelines for Indians (DGIs)' to meet the requirements of essential nutrients and prevent non-communicable diseases.

In their latest Dietary Guidelines, the Indian Council for Medical Research (ICMR) advised against the consumption of protein supplements (or protein powders) on a "regular basis". It explained that protein powders may contain added sugars, non-caloric sweeteners and additives such as artificial flavouring, hence, are not advisable to be consumed on a regular basis.

Protein powders are usually made from either eggs or dairy milk or whey – which is a byproduct of cheese or paneer. They could also be made from plant sources such as soyabeans, peas and rice. ICMR, in the revised 'Dietary Guidelines for Indians (DGIs)', mentioned that whey protein is rich in branched-chain amino acids (BCAAs). Further, based on recent evidence, ICMR cautioned that BCAAs may increase the risk of certain non-communicable diseases (NCDs).

Athletes can get adequate amount of protein from food alone

The dietary guidelines recommend that athletes can acquire the recommended amount of protein through food alone, without the use of supplements.

Athletes consume very high amounts of proteins, often as protein powders. According to ICMR, protein requirements are not as high as commonly perceived. In fact, as per the guidelines handbook, "Research findings indicate that dietary protein supplementation is associated with only a small increase in muscle strength and size during prolonged resistance exercise training (RET) in healthy adults; and protein intake levels greater than about 1.6g/kg/day do not contribute any further to RET-induced gains in muscle mass."

Source:https://www.thehindu.com/sci-tech/health/avoid-protein-supplements-says-icmr-in-dietary-guidelines-for-indians/article68158977.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 temperatures 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 feel 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/

SIDS4: South-South Cooperation is a Strategic Tool for Small Island Developing States

The United Nations Office for South-South Cooperation (UNOSSC) is participating at the 4th International Conference on Small Island Developing States to highlight the important role of South-South and triangular cooperation in accelerating progress towards the deliverables of the next Programme of Action for SIDS.

UNOSSC is committed to advancing sustainable development through robust South-South and triangular cooperation, particularly within the unique context of Small Island Developing States (SIDS) and other groups such as LDCs and LLDCs.

Relating to SIDS, UNOSSC's commitments, guided by the Antigua and Barbuda Agenda for SIDS (ABAS) of SIDS4, focuses on mobilizing partnerships that integrate South-South and triangular cooperation, complemented by North-South initiatives. These collaborations are essential for addressing climate change, enhancing disaster risk reduction, and promoting sustainability.

Notably, SIDS are the largest beneficiary group within the portfolios of the India, Brazil, and South Africa (IBSA) Fund and the India-UN Development Partnership Fund, managed by UNOSSC. Collectively, these funds have supported 63 country-level and multi-country projects in 33 countries, channeling over $55.5 million to SIDS across all geographical regions. The knowledge and good practices generated through those projects are being promoted to facilitate their scaling up across the global South.

Source:https://unsouthsouth.org/2024/05/22/sids4-south-south-and-triangular-cooperation-are-a-strategic-tool-for-sids/

India-UN Fund: Improving Income and Livelihood of Coconut Oil Production Communities in Kiribati

As requested by Government of Kiribati, India will provide funding support of US Dollar 900,000 from the India-UN Development Partnership Fund for the project, "Improving income and livelihood for Communities on the Outer Islands through Virgin Coconut Oil Production in Kiribati."

The project aims to establish two virgin coconut oil processing plants at Tamana and Nikunau islands; procure and install virgin coconut oil processing equipment; train community members and partner with organizations like the International Coconut Community. The project will result in the production of value-added products, improved economic returns, and enhanced income and livelihoods. The construction of two virgin processing plants will considerably develop the coconut sector in Kiribati which will cause improved livelihoods and reduce over-reliance on low-value copra and coconut crude oil products.

Hon'ble Prime Minister of India Shri Narendra Modi met with Heads of Delegation from Pacific Small Island Developing States (PSIDS) on September 24, 2019 in New York. In the spirit of "Sabka Saath, Sabka Vikas aur Sabka Vishwas" (together with all, for the development of all and with the trust of all), he announced allocation of US$ 1 million to each PSIDS towards implementation of high impact developmental project in the area of their choice. The project in Kiribati will be funded through this arrangement.

On this occasion, the Permanent Representative of India to the United Nations, Ambassador Ruchira Kamboj said, "India and PSIDS have shared values and a shared future. India will continue to support efforts of the PSIDS to achieve their developmental goals through necessary developmental and technical assistance".

Source:https://unsouthsouth.org/2024/05/06/india-un-fund-improving-income-and-livelihood-of-coconut-oil-production-communities-in-kiribati/

Enhanced Monitoring and Reporting of South-South Cooperation Discussed by African Peer Review Mechanism

United Nations Office for South-South Cooperation (UNOSSC) Chief, Intergovernmental and UN System Affairs, Denis Nkala, delivered a presentation on the significance of South-South and triangular cooperation for Africa's development and existing monitoring and evaluation tools to enhance reporting processes.

The presentation was targeted at participants at the second African Peer Review Mechanism (APRM) continental capacity program on South-South and triangular cooperation. The training was carried out in collaboration with strategic partners including the Islamic Development Bank (IsDB), UN World Food Program (WFP), International Fund for Agriculture Development (IFAD), Tunisian Agency for Technical Cooperation, and Rwanda Cooperation Initiative (RCI).

This 4-week program was developed by the APRM Monitoring and Evaluation Directorate to raise awareness and knowledge on South-South and triangular cooperation in Africa and the Global south to accelerate the implementation of Agenda 2063 and the Sustainable Development Goals (SDGs). The meeting brought together 286 participants from across Africa and beyond, including as far afield as India and Brazil.

During the presentation, Mr. Nkala highlighted some of the issues in the monitoring and evaluation of South-South cooperation, a modality that is based on very distinct principles. These include respect for national sovereignty, national ownership, equality, mutual benefit, non-conditionality, and non-interference. Innovation, adaptation and leapfrogging as well as the engagement of a multiplicity of implementing institutions are some of the additional unique aspects of South-South cooperation. In keeping with the spirit of South-South cooperation, projects, initiatives, programmes and general partnerships should ideally embody these principles. Subsequently, any monitoring and evaluation effort should be cognizant of this. However, general goals of any monitoring and evaluation undertaking still apply even when undertaking South-South cooperation monitoring.

Source: https://aprm.au.int/en/events/2024-03-06/aprm-e-training-south-south-and-triangular-cooperation

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 forums 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

Scientists document remarkable sperm whale 'phonetic alphabet'

Sperm whales use complex vocalisations resembling Morse code, revealing a sophisticated communication system with a “phonetic alphabet”

Scientists studying the sperm whales that live around the Caribbean island have described for the first time the basic elements of how they might be talking to each other.

The various species of whales inhabiting Earth's oceans employ different types of vocalisations to communicate. Sperm whales, the largest of the toothed whales, communicate using bursts of clicking noises — called codas — sounding a bit like Morse code.

A new analysis of years of vocalisations by sperm whales in the eastern Caribbean has found that their system of communication is more sophisticated than previously known, exhibiting a complex internal structure replete with a "phonetic alphabet." The researchers identified similarities to aspects of other animal communication systems — and even human language. Like all marine mammals, sperm whales are very social animals, with their calls an integral part of this. The new study has provided a fuller understanding of how these whales communicate.

"The research shows that the expressivity of sperm whale calls is much larger than previously thought," said Pratyusha Sharma, a Massachusetts Institute of Technology doctoral student in robotics and machine learning and lead author of the study published on May 7 in the journal Nature Communications.

"We do not know yet what they are saying. We are studying the calls in their behavioural contexts next to understand what sperm whales might be communicating about," said Ms. Sharma. Sperm whales, which can reach about 60 feet (18 metres) long, have the largest brain of any animal. They are deep divers, feeding on giant squid and other prey. The researchers are part of the Project CETI (Cetacean Translation Initiative) Machine Learning Team. Using traditional statistical analysis and artificial intelligence, they examined calls made by about 60 whales recorded by the Dominica Sperm Whale Project, a research program that has assembled a large dataset on the species.

Source:https://www.thehindu.com/sci-tech/science/scientists-document-remarkable-sperm-whale-phonetic-alphabet/article68152867.ece

What are colours and how do people understand them?

Colour is a type of information our eyes receive and process based on electromagnetic radiation

Colours have made their presence felt in several human endeavours throughout history

Colour plays an outsized role in the human experience of modern life. It invests both natural and synthetic worlds with beauty and meaning. Colours don’t deny universalism — a red sign will make you stop anywhere on the planet — yet they also make room for human cultures to appropriate them in unique, even discordant, ways. As the human understanding of colour has improved, and continues to do so, this knowledge has also broadened our sense of our place in this world, and the other life-forms with which we share it.

What is colour?

Colour is a type of information our eyes receive and process based on electromagnetic radiation. An object by itself can’t be said to have a colour — but based on which frequencies of visible-light radiation it absorbs, reflects, and/or scatters, we can perceive the object to have a particular colour. In the human eye, the rod and the cone cells receive information in the light that strikes the eye: the rod cells record brightness while the cone cells record the wavelengths, which the human brain interprets as colour. Human beings have three types of cone cells. Each type is sensitive to light of a different wavelength, and they work together to input colour information to the brain.

The possession of three types of cone cells is why humans are called trichromats. Many birds and reptiles, on the other hand, are tetrachromats (four types of cone cells). Similarly, while human vision is restricted to wavelengths from 400 nm to 700 nm (a.k.a. visible light), honeybees can also ‘see’ ultraviolet light and mosquitoes and some beetles can access information in some wavelengths of infrared radiation. (Humans sense the latter has heat.) This limitation, such as it is, is why those spectacular images captured by space telescopes of celestial wonders like nebulae need to be false-coloured: to highlight the information secreted in radio waves, X-rays, gamma rays, ultraviolet light, etc. Seen in visible light alone, many of these images will have much less visual detail.

Source:https://www.thehindu.com/sci-tech/science/what-are-colours-and-how-do-people-understand-them-explained/article68218179.ece