

TECHNOLOGY ROUNDUP

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Tech News Headlines

- Development of Efficient Regeneration System in Different Recalcitrant Rice Cultivars and Expression Analysis of Putative Transgenic Plants
- Real Time Monitoring and Supervisory Control of Distribution Load Based on Generic Load Allocation: A Smart Grid Solution
- A Smart Fluorescent Antenna For Wi-Fi Applications
- Platelet-Like Particles Augment Natural Blood Clotting for Treating Trauma
- Can A Stack of Computer Servers Survive an Earthquake?
- Water 'Thermostat' Could Help Engineer Drought-Resistant Crops
- Eating Baked, Broiled Fish Weekly Boosts Brain Health
- Batteryless Cardiac Pacemaker is Based on Automatic Wristwatch: Powered by Heart Motion

Tech & Trade Offers

CNG/NGV Fueling Solutions



Forthcoming Tech Events

- National Software Engineering Conference (NSEC 2014)
- International Conference on Management Research (ICMR) 2014
- International Conference on Energy Systems and Policies (ICESP-2014)
- 3rd International Conference on "Energy Environment & Sustainable Development (EESD 2014) Pakistan
- 37th World Energy Engineering Congress
- Canadian International Conference of Science and Technology
- 5th International Conference on Future-Oriented Technology Analysis (FTA)
- 10th Asian International Conference on Leather Science and Technology

Indigenous Technology

Development of Efficient Regeneration System in Different Recalcitrant Rice Cultivars and Expression Analysis of Putative Transgenic Plants

A team of researchers from Department of Genomics and Biotechnology, PARC Institute of Advanced studies in Agriculture (PIASA) NARC have Studied Efficient Regeneration System in Different Recalcitrant Rice Cultivars and Expression Analysis of Putative Transgenic Plants

Rice (*Oryza sativa* L.) is a staple food for more than half of the world population and a model monocot grass plant for both genetic and functional genomics studies. In Pakistan rice is cultivated on an area of 2.57 million hectares with annual production of 6.16 million tons and average yield of 2396 kg ha⁻¹. In Pakistan, rice occupies about 10% of the total cultivated area, accounts for 6.1% of value added in agriculture and 1.3% in gross domestic product (Government of Pakistan, 2012). Current research mostly emphasizes on the development of an efficient and genotype independent regeneration system for indica rice.

Establishment of an efficient and reproducible regeneration system in three different rice cultivars, IRRI-6, IRRI-9 and KSK-282 remained obscured. In the present study regeneration system was developed for all three recalcitrant cultivars and resultant putative transgenic plants were analyzed for expression by reverse transcriptase polymerase chain reaction (RT-PCR). Cultivars responded to a particular concentration of 2, 4-D ranging from 2 to 4mg L⁻¹ for calli initiation and induction. Two types of calli with different frequencies were observed on both N6 and N6 supplemented with proline, glycine and MES. N6 media produced more number of type II calli while N6 supplemented favored type I calli in all three cultivars. Type I calli were found as yellowish, smaller in size and globular shape and better explants for transformation. GUS histochemical assay showed that 11, 13 and 14 days older type I calli of KSK-282, IRRI-6 and IRRI-9 were suitable for transformation respectively. Fifteen minutes infection time and 2 days co-cultivation period showed the highest GUS positive expression in calli of all three cultivars. KSK-282 and IRRI-9 showed best regeneration response on 0.5 mg L⁻¹ kinetin, 1 mg L⁻¹ NAA and 3 mg L⁻¹ BAP, while the IRRI-6 showed the highest regeneration at 0.5 mg L⁻¹ kinetin, 1mg L⁻¹ NAA and 2 mg L⁻¹ BAP. Using optimized protocol for each cultivar GUS reporter gene has been successfully incorporated in the genome of all three cultivars. Transgene expression in resultant lines was confirmed at transcriptional level through reverse transcriptase polymerase chain reaction (RT-PCR). © 2014 Friends Science Publishers Keywords: Recalcitrant rice cultivars; Efficient regeneration; RT-PCR analysis; GUS histochemical assay

Courtesy:

International Journal of Agriculture and Biology, 2014, 16(4):700-706

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Indigenous Technology

Real Time Monitoring and Supervisory Control of Distribution Load Based on Generic Load Allocation: A Smart Grid Solution

A team of researchers from Department of Electrical Engineering, Mehran University of Engineering & Technology have studied Real Time Monitoring and Supervisory Control of Distribution Load Based on Generic Load Allocation: A Smart Grid Solution

The electrical power system in Pakistan is unpredictable, the power that is generated at the power stations does not meet the power requirement for the consumers, and mostly power shortage occurs whether it is winter or summer. We can't forecast how much power the consumer will use per day due to lack of power monitoring and mismanagement.

This research work is the small part of the smart grid system. This is regarding the check and balance of power consumption at the consumer level. It is a well known fact that the consumers are allocated a fixed load according to their requirement at the time of application for the electricity connection. When the consumer increases its load and does not inform the power company, the result is the overloading of the system.

This study presents a solution regarding distribution and load allocation to each customer. If the customer uses power greater than the load allocated, further power is not provided and consequently that appliance is not turned on unless the total load must not be decreased than the allocated load. This is achieved by designing a processor controlled system that measures the power on main line and also the power taken by each device. Now when a device is turned on, its power is measured by the controller and compares it with the main line power, and when the device consumes some power consequently main line power will also be increased thus this main line power is monitored and if it exceeds particular limit that device is turned off through its relay.

Courtesy:

Mehran University Research Journal of Engineering & Technology, 2014, 33 (2) 149-156

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A Smart Fluorescent Antenna For Wi-Fi Applications

The researchers from the University of Technology MARA (UiTM), Malaysia have developed a new invention uses ionized gas in fluorescent light tubes to transmit Internet wireless frequency signals throughout a building with the aid of already existing electrical wiring.



Due to continuously evolving applications, the electronic communications industry requires high performance and speed efficient systems. However, the physical limitations of microwave devices limits further improvements in current technology. This predicament has led to growing interest in the use of plasma as a conductive element in microwave devices due to their unique and innovative properties, which corresponds with traditional metallic antennas. This invention employs an ionized gas enclosed in a tube as the conducting element of an antenna. When the gas is electrically charged or ionized to plasma, it becomes conductive and allows radio frequency signals to be transmitted or received. When the gas is not ionized, the antenna element ceases to exist.

The invention features a smart fluorescent antenna with a 3G/3.75G/4G router for Wi-Fi applications. The antenna operates at the 2.4 GHz frequency band, which is suitable for Wi-Fi applications. A commercially available fluorescent tube, measuring 0.61 metres in length by 0.25 metres in diameter, is used as the plasma antenna. The gas inside the tube is a mixture of argon and mercury vapour, in the ratio 9:1. The tube is energized by a 240 V current, provided by a standard AC power supply. A glowing tube indicates that the gas inside the tube has been ionized to plasma and forms a plasma column. In this state, the plasma column becomes highly conductive and can be used as an antenna.

A coupling sleeve is positioned at the lower end of the tube, which is used to connect the plasma tube to the router. The function of the coupling sleeves is to store the electrical charge. When the gas inside the tube is sufficiently ionized into a plasma state, it becomes conductive and allows radio frequency signals to be transmitted or received.

Measurements indicate that the plasma antenna yields a return loss over 10 dB in the 2.23 GHz to 2.58 GHz frequency band. The antenna's ability to operate as either a transmitter or receiver in this particular frequency band was verified through a series of wireless transmission experiments. The performance of this antenna was measured using the Wi-Fi Received Signal Strength Indicator (RSSI) technique.

The advantage of this product is its low cost. The Wi-Fi signal can be transmitted into other rooms using only one router with a splitter cable. The fluorescent tube has dual functionality, thereby reducing the cost of buying additional antennas. Commercial antennas are made from metal elements while this invention uses plasma element as its source of material. Normal antennas can only transmit and receive radio frequencies, while this product not only can be used for transmitting and receiving radio frequency signals, but as a light emitting device as well.

www.sciencedaily.com

Platelet-Like Particles Augment Natural Blood Clotting for Treating Trauma

Researchers from the Georgia Institute of Technology, Emory University, Children's Healthcare of Atlanta and Arizona State University have developed a new class of synthetic platelet-like particles that could augment natural blood clotting

for the emergency treatment of traumatic injuries and potentially offer doctors a new option for curbing surgical bleeding and addressing certain blood clotting disorders without the need for transfusions of natural platelets.



The clotting particles, which are based on soft and deformable hydrogel materials, are triggered by the same factor that initiates the body's own clotting processes. Testing done in animal models and in a simulated circulatory system suggest that the particles are effective at slowing bleeding and can safely circulate in the bloodstream. The particles have been tested with human blood, but have not undergone clinical trials in humans.

When used by emergency medical technicians in the civilian world or by medics in the military, the

researchers expect this technology could reduce the number of deaths from excessive bleeding and could be injected to go specifically to the site of a serious injury that could help decrease the number of deaths associated with serious injuries.

The effectiveness of the platelet-like particles has been tested in an animal model and in a microfluidic chamber designed to simulate conditions within the body's circulatory system. In the chamber, tubes about the thickness of a human hair were lined with endothelial cells as in natural blood vessels. The chamber was used to study normal human blood, as well as human blood that had been depleted of its natural platelets. In platelet-rich blood, clots formed as expected, and blood without platelets did not form clots. When the platelet-like particles were added to the platelet-depleted blood, it was able to clot.

The researchers also tested blood from infants that had undergone open heart surgery, which requires that their blood be diluted, reducing its clotting ability. When platelet-like particles were added to the dilute neonate blood, it was able to form clots. Finally, safety testing was done on blood from hemophiliac patients. Because that blood lacks the triggers needed to cause fibrin formation, the particles had no effect. Before they can be used in humans, the particles will have to undergo human trials and receive clearance from the U.S. Food & Drug Administration (FDA).

About one micron in diameter, the particles were originally developed to be used on the battlefield by wounded soldiers, who might self-administer them using a device about the size of a smartphone. But the researchers believe the particles could also reduce the need for platelet transfusions in patients undergoing chemotherapy or bypass surgery, and in those with certain blood disorders.

While the platelet-like particles lack many features of natural platelets, the researchers were surprised to find one property in common. Clots formed by natural platelets begin to contract over a period of hours, beginning the body's repair process. Clots formed from the synthetic particles also contract, but over a longer period of time, Brown noted.

www.news.gatech.edu

Can A Stack of Computer Servers Survive An Earthquake?

In high-seismic regions, new facilities often are engineered with passive protective systems that provide overall seismic protection. But often, existing facilities are conventional fixed-base buildings in which seismic demands on sensitive



equipment located within are significantly amplified. In such buildings, sensitive equipment needs to be secured from these damaging earthquake effects. How do you prevent an earthquake from destroying expensive computer systems?

That's the question earthquake engineer at Howard University, aims to answer through a series of experiments conducted at the University at Buffalo. The loss of functionality of essential equipment and components can have a disastrous impact. The researchers claim that they can limit these sorts of equipment losses by improving their seismic performance.

In buildings such as data centers, power plants and hospitals, it could be catastrophic to have highly-sensitive equipment swinging, rocking, falling and generally bashing into things.

In high-seismic regions, new facilities often are engineered with passive protective systems that provide overall seismic protection. But often, existing facilities are conventional fixed-base buildings in which seismic demands on sensitive equipment located within are significantly amplified. In such buildings, sensitive equipment needs to be secured from these damaging earthquake effects.

The stiffer the building, the greater the magnification of seismic effects, she added. It is like when you are riding a rollercoaster. If your body is relaxed, you don't feel strong inertial effects. But if you hold your body rigid, you'll feel the inertial effects much more, and you'll get knocked about in the car. Similarly, The experiments were conducted this month at the University at Buffalo's Network for Earthquake Engineering Simulation (NEES), a shared network of laboratories based at Purdue University. The researchers team used different devices for supporting 40 computer servers donated by Yahoo Labs. The researchers attached the servers to a frame in multiple configurations on seismically isolated platforms. They then subjected the frame to a variety of three-directional ground motions with the servers in partial operation to monitor how they react to an earthquake simulation.

Preliminary work confirmed, among other things, that globally and locally installed seismic isolation and damping systems can significantly reduce damage to computer systems and other electronic equipment. Base isolation is a technique that sets objects atop an energy-absorbing base; damping employs energy-absorbing devices within the object to be protected from an earthquake's damaging effects.

www.lockerdome.com

Water 'Thermostat' Could Help Engineer Drought-Resistant Crops

A gene that could help engineer drought-resistant crops has been identified by researchers. The gene, called OSCA1, encodes a protein in the cell membrane of plants that senses changes in water availability and adjusts the plant's water conservation machinery accordingly. The findings could make it easier to feed the world's growing population in the face of climate change.

Duke University researchers have identified a gene that could help scientists engineer drought-resistant crops. The gene, called OSCA1, encodes a protein in the cell membrane of plants that senses changes in water availability and adjusts the plant's water conservation machinery accordingly. "It's similar to a thermostat. The findings, could make it

easier to feed the world's growing population in the face of climate change.

Drought is the major cause of crop losses worldwide. A dry spell at a crucial stage of the growing season can cut some crop yields in half. Water shortages are expected to become more frequent and severe if climate change makes rainfall patterns increasingly unreliable and farmland in some regions continues to dry up. Coupled with a world population that is expected to increase by two billion to three billion by 2050, researchers worldwide are looking for ways to produce more food with less water.

Some researchers hope that genetic engineering, in addition to improve farming practices and traditional plant breeding will add to the arsenal of techniques to help crops withstand summer's swelter. But engineering plants to withstand drought has proven difficult to do, largely because plants use so many strategies to deal with dehydration and hundreds of genes are involved.

The problem is confounded by the fact that drought is often accompanied by heat waves and other stresses that require different coping strategies on the part of the plant. One way that plants respond to water loss is by boosting the levels of calcium within their cells. The calcium surge acts as an alarm signal that triggers coping mechanisms to help the plant rebalance its water budget. But until now, the molecular machinery that plants use to send this signal and monitor water availability in general remained unknown. Pei and Duke colleagues Fang Yuan, James Siedow and others identified a gene that encodes a protein in the cell membranes of plant leaves and roots, called OSCA1, which acts as a channel that allows calcium to surge into the cell in times of drought.

The gene was identified in *Arabidopsis thaliana*, a small unassuming plant related to cabbage and canola that is the lab rat of plant research. Plants with defective versions of the calcium channel don't send an alarm signal under water stress like normal plants do. When the researchers grew normal plants and plants with defective versions of the gene side by side in the same pot and exposed them to drought stress, the mutant plants experienced more wilting.

The findings could lead to new ways to help plants thrive when water is scarce. The team's next step is to manipulate the activity of the OSCA1 gene and related genes and see how those plants respond to drought information that could lead to crops that respond more quickly and efficiently to dehydration. Plants that enter drought-fighting mode quickly and then switch back to normal growth mode quickly when drought stress is gone should be able to allocate energy more efficiently toward growth.

www.zeenews.india.com

Eating Baked, Broiled Fish Weekly Boosts Brain Health

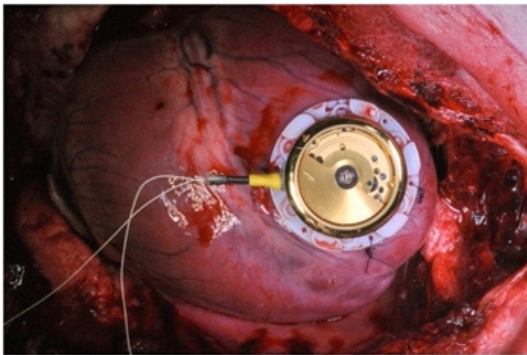
Scientist from University of PITTS Burg, USA investigated that eating baked or broiled fish once a week is good for the brain, regardless of how much omega-3 fatty acid it contains, according to researchers. The findings add to growing evidence that lifestyle factors contribute to brain health later in life. Scientists estimate that more than 80 million people will have dementia by 2040, which could become a substantial burden to families and drive up health care costs. It is estimated that more than 80 million people will have dementia by 2040, which could become a substantial burden to families and drive up health care costs. Some studies have predicted that lifestyle changes such as a reduction in rates of physical inactivity, smoking and obesity could lead to fewer cases of Alzheimer's disease and other conditions of cognitive impairment in the elderly.

The anti-oxidant effect of omega-3 fatty acids, which are found in high amounts in fish, seeds and nuts, and certain oils, also have been associated with improved health, particularly brain health. The study shows that people who ate a diet that included baked or broiled, but not fried, fish have larger brain volumes in regions associated with memory and cognition. The researchers did not find a relationship between omega-3 levels and these brain changes, which surprised us a little. It led us to conclude that we were tapping into a more general set of lifestyle factors that were affecting brain health of which diet is just one part.

The research team analyzed data from 260 people who provided information on their dietary intake, had high-resolution brain MRI scans. The participants from Cardiovascular Health Study (CHS), answered questionnaires about their eating habits, such as how much fish did they eat and how was it prepared. The researchers say that baked or broiled fish contains higher levels of omega-3s than fried fish because the fatty acids are destroyed in the high heat of frying, so we took that into consideration when we examined their brain scans. They found that people who ate baked or broiled fish at least once a week had greater grey matter brain volumes in areas of the brain responsible for memory (4.3 percent) and cognition (14 percent) and were more likely to have a college education than those who didn't eat fish regularly, the researchers found. But no association was found between the brain differences and blood levels of omega-3s. This suggests that lifestyle factors, in this case eating fish, rather than biological factors contribute to structural changes in the brain. The researchers say that a confluence of lifestyle factors likely are responsible for better brain health, and this reserve might prevent or delay cognitive problems that can develop later in life.

www.zeenews.com

Batteryless Cardiac Pacemaker is Based on Automatic Wristwatch: Powered by Heart Motion



A new batteryless cardiac pacemaker based on an automatic wristwatch and powered by heart motion has been presented by researchers. The prototype device does not require battery replacement.

Researchers from University of Bern, Switzerland developed a new batteryless cardiac pacemaker based on an automatic wristwatch and powered by heart motion was presented at ESC Congress 2014 today by Adrian Zurbuchen from Switzerland. The prototype device does not require battery replacement. Batteries are a limiting factor in today's medical implants. Once they reach a critically low energy level, physicians see themselves forced to replace a correctly functioning medical device in a surgical intervention. This is an unpleasant scenario

which increases costs and the risk of complications for patients.”

Four years ago, a cardiologist and engineer at the University of Bern, had the idea of using an automatic wristwatch mechanism to harvest the energy of heart motion. Because heart seems to be a very promising energy source because its contractions are repetitive and present for 24 hours a day, 7 days a week. The researchers' first prototype is based on a commercially available automatic wristwatch. All unnecessary parts were removed to reduce weight and size. In addition, they developed a custom-made housing with eyelets that allows suturing the device directly onto the myocardium.

The prototype works the same way it would on a person's wrist. When it is exposed to an external acceleration, the eccentric mass of the clockwork starts rotating. This rotation progressively winds a mechanical spring. After the spring is fully charged it unwinds and thereby spins an electrical micro-generator. To test the prototype, the researchers developed an electronic circuit to transform and store the signal into a small buffer capacity. They then connected the system to a custom-made cardiac pacemaker. The system worked in three steps. First, the harvesting prototype acquired energy from the heart. Second, the energy was temporarily stored in the buffer capacity. And finally, the buffered energy was used by the pacemaker to apply minute stimuli to the heart. The researchers successfully tested the system in in vivo experiments with domestic pigs. The newly developed system allowed them for the first time to perform batteryless overdrive-pacing at 130 beats per minute.

The researchers say that it is possible to pace the heart using the power of its own motion. The next step in our prototype is to integrate both the electronic circuit for energy storage and the custom-made pacemaker directly into the harvesting device. This will eliminate the need for leads.

www.alphagalileo.org

Forthcoming Tech Events

National Events

National Software Engineering Conference (NSEC 2014)

11-12 November, 2014
Rawalpindi, Pakistan
www.nsec.mcs.edu.pk

International Conference on Management Research (ICMR) 2014

20 - 21 November, 2014
Lahore, Pakistan
www.superior.edu.pk

International Conference on Energy Systems and Policies (ICESP-2014)

24-26, November, 2014
Islamabad, Pakistan
www.auconferences.com/icesp

3rd International Conference on “Energy Environment & Sustainable Development (EESD 2014) Pakistan

22-24, October, 2014
Sindh, Pakistan
www.eesd.muet.edu.pk

International Events

37th World Energy Engineering Congress

1st-2nd October, 2014
Washington, DC, United States of America
www.energycongress.com

Canadian International Conference of Science and Technology

14-15 November, 2014
Toronto, Ontario, Canada
www.caar-science.org

5th International Conference on Future-Oriented Technology Analysis (FTA)

27-28 November, 2014
Brussels, Belgium
www.era.gv.at

10th Asian International Conference on Leather Science & Technology

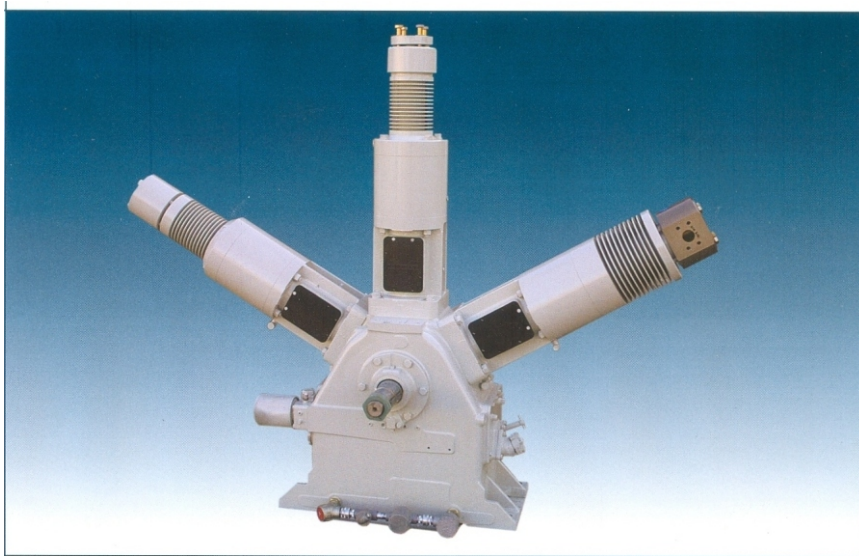
23-26 November, 2014
Okayama, Japan
www.aiclst2014.jp

Tech & Trade Offers

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