

TECHNOLOGY ROUNDUP

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- **8th Food Technology and Machinery International Show, 2015**
- **Food Technology Asia, 2015**
- **Solar 2015 Conference & Expo**
- **15th International Conference & Exhibition on Engineering Fields**
- **International Innovation and Technology Exhibition (INOTEX 2015)**
- **4th International Conference on Bio-Sensing Technology**
- **CTBT: Science and Technology 2015, Conference**

Indigenous Technology

Prototype Design and Experimentation of Reverse Osmosis (RO) Based Wastewater Treatment

Researchers from Department of Chemical Engineering, University of Engineering and Technology, Peshawar have studied of Prototype Design and Experimentation of Reverse Osmosis (RO) Based Wastewater Treatment

Huge water resources are available in various parts of the world but are contaminated. Contaminated water sources have direct and indirect effect on human health. There are numerous diseases like diarrhea, cholera, typhoid fever are transmitted through the polluted water. Membrane filtration technology offers an advanced alternative for conventional water treatment technology by producing water free of biological contamination. Especially, Reverse Osmosis (RO) and Nano filtration (NF) technologies, mainly because of their small pore sizes, have a great potential to remove biodegradable organic substances from source water and consequently reduce the potential for bacterial growth in the distribution system. However, pilot scale studies have not been found in the literature to treat the raw water including physical and biological wastewater characteristics in one step.

Abstract In the past few years, the commercialization of small scale reverse osmosis(RO) plant for low total dissolved solids(TDS) brackish and contaminated groundwater water desalination offered an alternative solution to obtain drinking water with TDS lower than 500mg/L. Due to rapid development in membrane technology the technical and economical usefulness of RO process has been improved. In the current research work, a prototype Reverse Osmosis (RO) wastewater treatment plant has been developed and its performance was evaluated to produce the safe and drinkable water at local small community. Salt rejection and permeate water flow rate are the key performance parameters. These performance parameters are influenced by other variable parameters such as applied feed pressure, temperature, recovery and feed water salinity. The RO plant performance has been evaluated through testing different water quality parameters; including physical, chemical and biological analysis of the treated sample. The plant was operated by varying feed water pressures and feed water salinity which indicated that the product water has the highest quality and maximum permeate low rate at 25 bar of applied feed water pressure for feed water salinity up to 4000 mg/L. The water quality results indicate that permeate obtained after treatment has excellent quality free physical and microbial contaminants.

Courtesy:

NUST Journal of Engineering Sciences, 2013 6(1) 5-9

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Indigenous Technology

Evaluating The Success of Vegetative Propagation Techniques in Loquat Cv. Mardan

Researchers from Department of Horticulture, Pir Mehr Ali Shah-Arid Agriculture University, Rawalpindi have Evaluated The Success of Vegetative Propagation Techniques in Loquat Cv. Mardan

Loquat (*Eriobotrya japonica* Lindl.) belongs to the family Rosaceae, subfamily Pomoideae is an evergreen fruit tree. So far, loquat has been grown in over 30 countries in the world. China is the leading country in loquat cultivation followed by Spain and Japan (Lin et al., 2007). In Pakistan, its production is 13,159 tons. Loquat fruit matures in early spring season. In Pakistan, its fruit becomes available in the months of March and April, when none of the other fresh fruit is available in the market, hence fetch good returns. Increasing trend in loquat area as well as production indicates its great potential in the country.

Loquat cv. Mardan is a promising variety in loquat growing areas of northern Punjab and Khyber Pakhtoon Khwa. Loquat growers face serious issue of true to type plants availability. An attempt was made to explore different vegetative propagation techniques to find out most successful method for nursery industry. In the study propagation through cutting (during spring) and grafting during different suitable seasons (spring and monsoon) was examined. Cuttings were treated with different growth regulators to promote rooting. PBZ, IBA and their combinations were applied to the cuttings. Highest success percentage (40%) was achieved with PBZ. This limited success in rooting of cuttings was complete failure in getting plant survival at the end of the study. In the second phase of the experiment different grafting techniques i.e. tongue, cleft and side grafting were evaluated during two different seasons i.e., spring and monsoon. Cleft grafting in the months of March/ April proved to be most successful method in terms of success (70%), days taken for shoot growth, no. of leaves, shoots length, no. of branches. While in monsoon season side grafting was significantly better with a success of 85%. Overall, monsoon side grafting proved to be more successful than any other method.

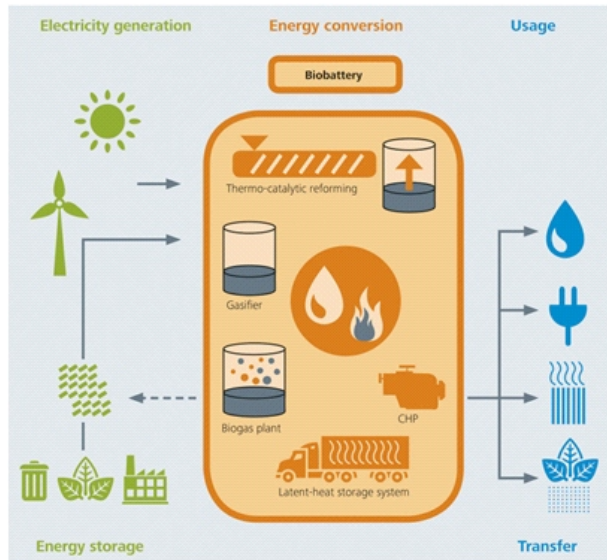
Courtesy:

Pakistan Journal of Botany, 2014,46 (2) 579-584

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Widely used Food Additives Promotes Colitis, Obesity and Metabolic Syndrome, shows Study of Emulsifiers

Sewage sludge, green waste, production residue from the food industry, straw or animal excrement with the biobattery's modular concept a much larger range of biomass can be utilized for energy recovery than previously. Researchers show that they can convert organic residues into electricity, heat, purified gas, engine oil and high quality biochar using this process. Biogas plants are an important element for decentralized energy supply. They produce electricity from renewable resources and can compensate for highly fluctuating wind and solar energy. There are already 8,000 plants in operation in Germany with an electrical output of 3.75 gigawatts in total, that is the equivalent to roughly three nuclear power plants. However, the plants have several disadvantages too: they only process a limited range of organic substances and are in competition with the cultivation of food plants.



Scientists from the Fraunhofer Institute for Environmental, Energy and Safety Technology UMSICHT, Germany have now succeeded in considerably improving the efficiency of biogas plants. The biobattery process developed by them not only supplies electricity and heat but also high quality products such as gas, oil and vegetable carbon. These can be utilized as required, for example to produce electricity, as

marine or aviation fuel, as an admixture for fuels or as a fertilizer. If further processed they even provide basic substances for the chemical industries. The biobattery is modular and consists of a pool of environmentally-friendly technologies such as biogas plants, thermal storage, carburetors and engines to produce electricity. The heart of the concept is thermo-catalytic reforming (TCR®). With this the experts convert carbons out of organic material, for example fermentation residues from biogas plants and bioethanol production, industrial biomass waste, sewage sludge, straw, scrap wood or animal excrement. The result: oil, gas and biomass cokes. "The particular advantage of the biobattery is that we can utilize a number of raw materials which would otherwise have to be disposed of often at great cost.

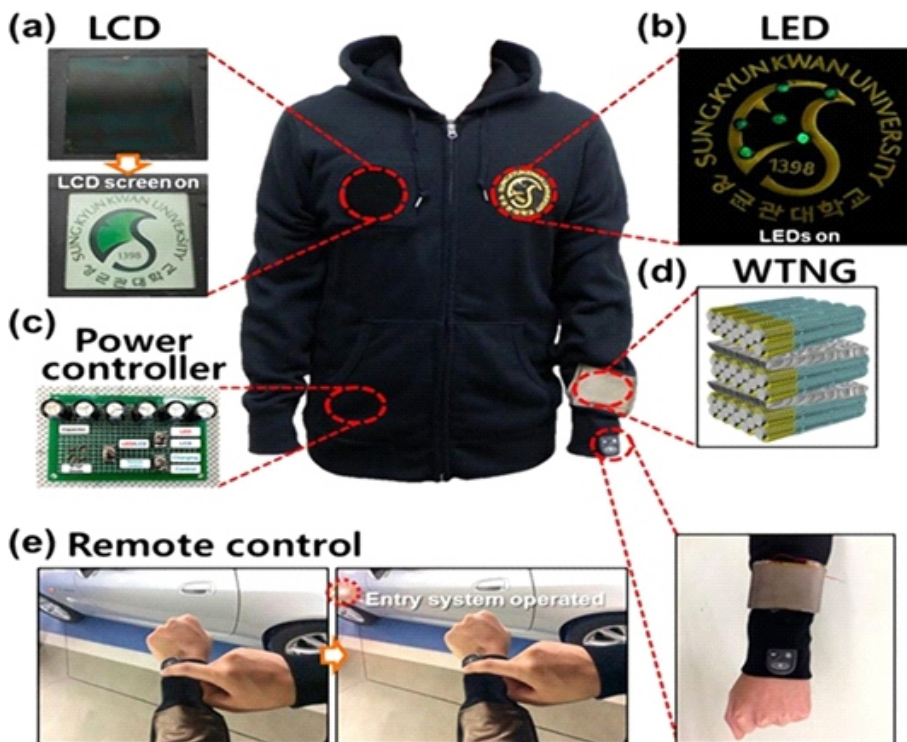
Researchers are demonstrating that this also works in practice at a pilot plant that utilizes roughly 30 kg of fermentation residues every hour. The raw materials first pass through a sluice without oxygen into a continuously rotating screw. There the material is heated up and broken down into biochar and volatile vapours. The vapours are reheated and then cooled down again. In the process it condenses into a liquid, which contains bio-oil and water. Researchers separate the high quality oil to reuse it. The resulting gas is purified and collected. The liquid, gaseous and solid products can be reutilized in various ways. The oil can either be processed into marine and aviation fuel or used in a combined heat and power plant, as can the gas, to produce electricity and heat. The separated process water contains numerous short-chain biodegradable carbon compounds. It can be fed back into the biogas plant to increase the methane yield. The biochar is ideal as a soil conditioner.

The plant converts more than 75 percent of the energy efficiency into high quality energy sources in a robust, continuous process. The efficacy can be improved even more if mobile latent heat accumulators are used. One particular advantage of the biobattery is that the system can be gradually expanded. "This is very interesting for operators in terms of finance. High investments are not required at the start, as its profitability analyses proved. Researchers have developed a new way of rapidly screening yeasts that could help produce more sustainable biofuels. The new technique could also be a boon in the search for new ways of deriving valuable renewable chemicals from plant-based wastes, reducing our reliance on petrochemicals.

www.fraunhofer.de/en/press

Energy-Generating Cloth Could Replace Batteries in Wearable Devices

From light-up shoes to smart watches, wearable electronics are gaining traction among consumers, but these gadgets' versatility is still held back by the stiff, short-lived batteries that are required. These limitations, however, could soon be overcome. Scientists report the first durable, flexible cloth that harnesses human motion to generate energy. It can also self-charge batteries or supercapacitors without an external power source and make new commercial and medical applications possible.



Scientists at [Sungkyunkwan University](#) in Korea and [University of Wollongong](#) in Australia pointed out that the potential of wearable electronics extends far beyond the flashy and convenient. Small, lightweight devices could play life-changing roles as robotic skin or in other biomedical applications. But to maximize their utility, such electronics need an ultra-flexible, long-lasting energy source that is seamlessly incorporated into the device's design. For a possible solution, Kim's team turned to the emerging technology of "triboelectric nanogenerators," or TNGs, which harvest energy from everyday motion.

The researchers created a novel TNG fabric out of a silvery textile coated with nanorods and a silicon-based organic material. When they stacked four pieces of the cloth together and pushed down on the material, it captured the energy generated from the pressure. The material immediately pumped out that energy, which was used to power light-emitting diodes, a liquid crystal display and a vehicle's keyless entry remote. So the researchers developed a new method of incorporating TNGs into cloth that allows it to be chemically and physically durable, using a silverized cloth material with nanorods and a silicon-based organic material embedded in four layers of cloth. They were able to generate a high output voltage (up to 120V) with an output current of 65 microamperes. In tests, they found that the WTNGs (wearable TNGs) were able to power light-emitting diodes, a liquid crystal display, and a vehicle's keyless entry remote, and worked for more than 12,000 cycles.

www.acs.org

Flexible Sensors Turn Skin Into a Touch-Sensitive Interaction Space for Mobile Devices

If a mobile phone rings during a meeting, its owner often has to dig it out before it can be muted. A more discreet method would be to decline the incoming call by pressing on one of your fingers. Computer scientists are studying the potential use of the human body as a touch sensitive surface for controlling mobile devices. They



have developed flexible silicone rubber stickers with pressure-sensitive sensors that fit snugly to the skin. By operating these touch input stickers, users can use their own body to control mobile devices. Because of the flexible material used, the sensors can be manufactured in a variety of shapes, sizes and personalized designs. A team of computer scientists from Saarbrücken in collaboration with researchers from Carnegie Mellon University in the USA have developed touch-sensitive stickers made from flexible silicone and electrically conducting sensors that can be worn on the skin.

The stickers can act as an input space that receives and executes commands and thus controls mobile devices. Depending on the type of skin sticker used, applying pressure

to the sticker could, for example, answer an incoming call or adjust the volume of a music player. The stickers allow to enlarge the input space accessible to the user as they can be attached practically anywhere on the body. The 'iSkin' approach enables the human body to become more closely connected to technology.

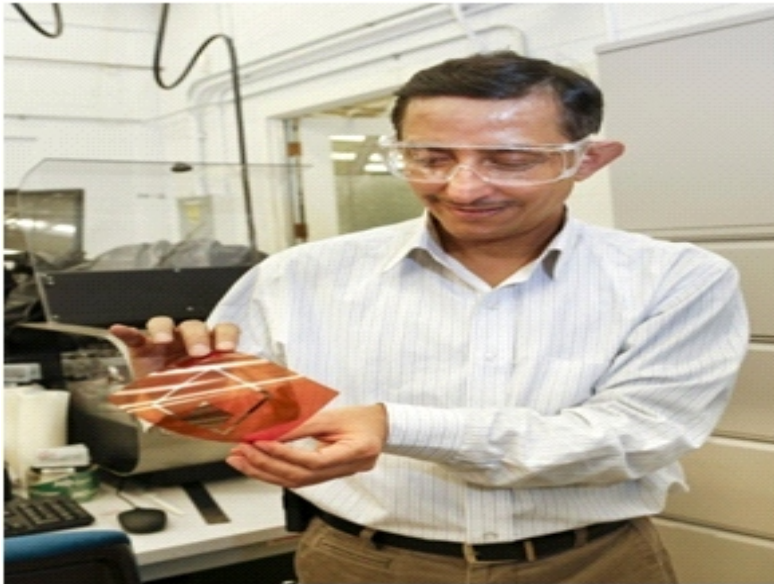
Users can also design their iSkin patches on a computer beforehand to suit their individual tastes. One sticker, for instance, is based on musical notation, another is circular in shape like an LP. The silicone used to fabricate the sensor patches makes them flexible and stretchable. This makes them easier to use in an everyday environment. The music player can simply be rolled up and put in a pocket. They are also skin-friendly, as they are attached to the skin with a biocompatible, medical-grade adhesive. Users can therefore decide where they want to position the sensor patch and how long they want to wear it.

In addition to controlling music or phone calls, the iSkin technology could be used for many other applications. For example, a keyboard sticker could be used to type and send messages. Currently the sensor stickers are connected via cable to a computer system. According to Steimle, in-built microchips may in future allow the skin-worn sensor patches to communicate wirelessly with other mobile devices.

www.cacm.acm.org/news

Energy use in Buildings: Innovative, Lower Cost Sensors and Controls Yield Better Energy Efficiency

Buildings are responsible for about 40 percent of the energy consumed in the United States. Studies indicate that advanced sensors and controls have the potential to reduce the energy consumption of buildings by 20-30 percent. Regulating comfort in small commercial buildings could become more efficient and less expensive



thanks to an innovative low-cost wireless sensor technology being developed by researchers at the Department of Energy's Oak Ridge National Laboratory, USA.

It is widely accepted that energy-consuming systems such as heating, ventilating, and air conditioning (HVAC) units in buildings are under, or poorly, controlled causing them to waste energy. Buildings could increase their energy efficiency if control systems had access to additional information. Collecting data such as outside air and room temperature, humidity, light level, occupancy and pollutants is currently cost prohibitive, whether the information is gathered by inexpensive conventional sensors that must be wired, or by using today's expensive \$150-300 per node wireless sensors.

ORNL's new wireless sensor prototype could reduce costs to \$1-10 per node by leveraging advanced manufacturing techniques such as additive roll-to-roll manufacturing. This process enables electronics components like circuits, sensors, antennae, and photovoltaic cells and batteries to be printed on flexible plastic substrates (base materials). The nodes can be installed without wires using a peel-and-stick adhesive backing. If commercially available at the target price point, there would be endless application possibilities where the installed cost to improve the control of energy-consuming systems would pay for itself through lower utility bills in only a few years.

The ultra-low power smart sensors collect and send data to a receiver, which can capture data from many different peel-and-stick nodes and provide the information to the energy-consuming system. The more information received, the better the building's energy management. Both new construction and retrofitted buildings can benefit from ORNL's smart sensors. "This technology provides the information that enables ongoing continuous commissioning, fault detection and diagnosis, and service organization notifications when needed, ensuring optimal building system operations throughout their service life. ORNL is currently in negotiating to establish a cooperative research and development agreement with a premier international electronics manufacturer to make the low-cost wireless sensors commercially available.

www.ornl.gov/ornl

Forthcoming Tech Events

National/International Events

13th International Exhibition for the Energy Industry

23-25, April, 2015

Karachi, Pakistan

[Www.pogeepakistan.com](http://www.pogeepakistan.com)

8th Food Technology and Machinery International Show, 2015

12-14, May 2015

Karachi, Pakistan

www.foodtechnolgyasia.com

Food Technology Asia, 2015

9-11 June, 2015

Karachi

www.foodtechnologyasia.com

Solar 2015 Conference & Expo

7-8, May, 2015

Melbourne, Australia

www.enfsolar.com

15th International Conference & Exhibition on Engineering Fields

1 - 5 June 2015

Leuven, Belgium

www.euspen.eu

International Innovation and Technology Exhibition (INOTEX 2015)

9-12 June 2015

Tehran

www.bitcongress.com

4th International Conference on Bio-Sensing Technology

10-13, May, 2015

Lisbon, Portugal

www.biosensingconference.com

CTBT: Science and Technology 2015, Conference

22-26 June, 2015

Austria

www.ctbto.org

Tech & Trade Offers

LVD Induction Lamp Technology Save Energy Save Money



Life expectancy for these lamps is around 10,000 hours with superior lumen maintenance to discharge lamps.

✎ Color LVD Induction lamps have a rendering index of Ra 80+ with colour temperature of 4100K.

✎ Temperature as low as -35 degree C or as high as 50 degree C.

✎ Efficiency LVD Induction lamps are generally rated at 90 lumen per watt, similar to conventional metal halide lamps, without the lumen depreciation.

✎ Operating Voltage LVD Induction lamps do not drop out the way that a normal discharge lamp does, even at 100 volts or as high as 280 volts.

✎ Flexibility The LVD Induction lamp is available in several configurations and watts, ranging from 15w, 23w, 40w, 80w, 120w, 200w versions. There are versions where the ballast is integral, or in the case of the higher E40 lamp base with remote ballast for simple installation retrofitting.

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