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Editorial Board

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High Speed Flat Multi Head Automatic Embroidery Machine

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Forthcoming Tech Events

- 4th Invention to Innovation Summit 2015
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- Pharmaceutics & Novel Drug Delivery Systems

PASTIC National Centre
Quaid-i-Azam University Campus
P.O. Box 1217, Islamabad

Phone: 051-9248103-4, 9248111
Fax: 051-9248113
Email:editor@pastic.gov.pk
Web: www.pastic.gov.pk

Indigenous Technology

Quality Assessment of Organic and Biofertilizers Developed From Fruit And Vegetable Waste

Researchers from Department of Soil Science, Sindh Agriculture University, Tandojam & Institute of Soil & Environmental Sciences, University of Agriculture Faisalabad have Quality Assessment of Organic and Biofertilizers Developed From Fruit And Vegetable Waste

Pakistan faces volumes of municipal, industrial and fruit/vegetable wastes. The application of these organic wastes to supplement plant nutrition in large amounts has its own issues. Nonetheless, the recent literature suggests that these materials can be composted and effectively utilized as a supplement to chemical fertilizers.

Composting can be defined as the process of biological decomposition of organic substrates under controlled conditions. The finally produced organic material can be utilized as organic fertilizers and as a carrier for bio-fertilizers. Organic fertilizers are developed from the composted waste materials to supply essential nutrients to plants. This technology has been emerged as a very useful practice of low-cost plant nutrition. Such specially developed fertilizer products are very well known for their being low-cost and environment friendly. Value addition of compost through enrichment with chemical fertilizers could lead its application at substantially lower rates and improve nutrient use efficiency by crops.

In this study, the scientists utilized fruit and vegetable waste material to develop organic potassium (K) fertilizer and ACC- deaminase rhizobacterial bio-fertilizers for sustainable maize production. Organic K fertilizer, with L-tryptophan blending, was developed through mechanical composting. This organic material was also used as a carrier to develop two different bio-fertilizer products by involving selected biotypes of Pseudomonas fluorescens. In a series of short laboratory experiments, we assessed the quality of these newly developed fertilizer products against raw form of organic waste. Composting of organic waste material decreased soil carbon to nutrient ratios and increased the macro and micronutrient contents of soil. A continuous gradual release of CO2 was noted in soil amended with organic and biofertilizers which exhibited greater stability of these fertilizer products over raw form of organic waste. Likewise, soil aggregate stability of these fertilizer products was also higher than raw form of organic waste. Moreover, soil retained comparatively higher moisture when amended with organic and bio-fertilizer products as compared to raw form of organic waste. These results suggest that organic wastes should not be used in their raw forms and must be transformed into value-added organic and bio-fertilizers for improving soil health.

Courtesy:

Pakistan Journal of Agriculture Engineering, Veterinary Sciences, 2014, 30 (1): 32-42
A. N. Shah, S. D. Tunio: Department of Agronomy, Sindh Agriculture University, Tandojam, Pakistan
Zia-ul-hassan (Department of Soil Science, Sindh Agriculture University, Tandojam, Pakistan) M. Arshad: (Institute of Soil & Environmental Sciences, University of Agriculture Faisalabad, Pakistan)

www.sau.edu.pk

Indigenous Technology

A Study of Drinking Water of Industrial Area of Sheikhupura with Special Concern to Arsenic, Manganese and Chromium

A team of researchers from University of Engineering & Technology Lahore, University of the Punjab, Lahore and Bahauddin Zakariya University, Multan have carried out a collaborative study of Drinking Water of Industrial Area of Sheikhupura with Special Concern to Arsenic, Manganese and Chromium

Water is the most abundant compound on the earth and is essential for the survival of all living organisms. Generally, drinking water containing different anions and heavy metals including Cd, Cr, Co, Hg, Ni, Pb, Zn etc, has significant adverse effects on human health either through deficiency or toxicity due to excessive heavy metals In Pakistan drinking water is continuously being deteriorated due to untreated municipal and industrial water and drainage from agriculture effluents. The Sheikhupura Industrial Estate has been established since 1969 with the sole objective to develop and accelerate industrial pace with the establishment of heavy and large scale industries including paper, seed, leather, steel, stainless steel, chemical, pharmaceutical, rice, stone and marble grinding, textile, poultry and animal feed, flour, soap and many other industries. According to a few studies ceramics, steel, leather, textile, Pharmaceuticals, fertilizer are few of those major industries that are reason for the water pollution.

In this study reserchers focused their attention to analyze the drinking water of industrial area of Sheikhupura that is swarming with small and large industries. Previously no work has been reported related to this area. Samples were collected from the twelve different sites of the mentioned area for six months at frequency of once per fifteen days. The samples were analyzed under strict quality control conditions and ASTM (American Standard Testing Methods) methods were employed for strictly precise and accurate results. Four sites showed bacterial contamination, five sites indicated high level of TDS (Total Dissolved Solids) and conductivity. Only one site indicated elevated chromium level (0.6 mg/L), two depicted increased level of arsenic but five sites gave idea about the high level of manganese(highest average value 1.2 mg/L in the study area.

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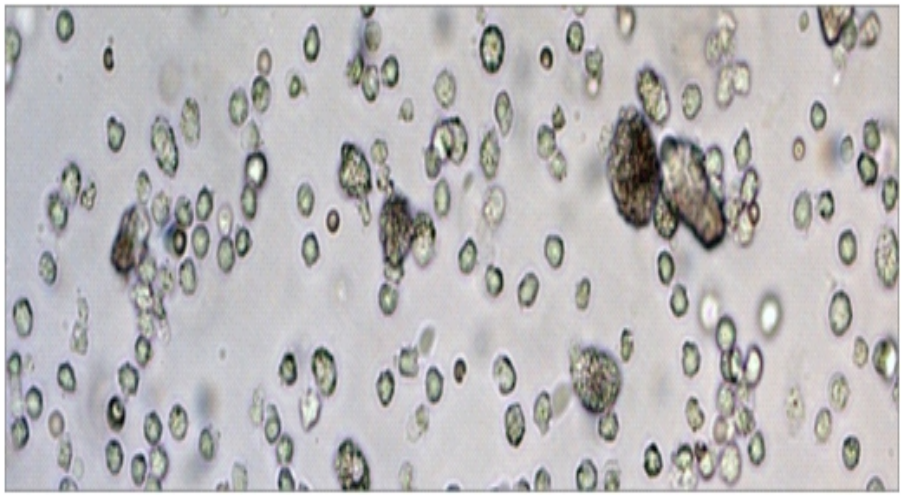
Courtesy:

Pakistan Journal Engineering & Applied Scieces, 2013, 13 (7) 118-126
Syeda Rubina Gilani: (Department of Chemistry, University of Engineering & Technology, Lahore, Pakistan) Zaid Mahmood: (Institute of Chemistry, University of the Punjab, Lahore-Pakistan, Dept of Botany University of the Punjab, Lahore, Pakistan) Musharaf Hussain: (Department of Chemistry, University of Engineering & Technology, Lahore, Pakistan) Yawar Baig: (Department of Chemistry, University of Engineering & Technology, Lahore, Pakistan) Zaigham Abbas: (Central Laboratory for Environmental Analysis and Networking, Pak-EPA, Islamabad) Samana Batool: (Bahauddin Zakariya University, Multan, Pakistan)

www.pakbs.org

Injectable 3-D Vaccines could Fight Cancer, and Infectious Diseases

A non-surgical injection of programmable biomaterial that spontaneously assembles in vivo into a 3-D structure could fight and even help prevent cancer and also infectious disease such as HIV, scientists have demonstrated. Tiny biodegradable rod-like structures made from silica, known as mesoporous silica rods (MSRs), can be loaded with biological and chemical drug components and then delivered by needle just underneath the skin, they explain.



One of the reasons cancer is so deadly is that it can evade attack from the body's immune system, which allows tumors to flourish and spread. Scientists can try to induce the immune system, known as immunotherapy, to go into attack mode to fight cancer and to build long lasting immune resistance to cancer cells.

Researchers at the Wyss Institute for Biologically Inspired Engineering at Harvard University and Harvard's School of Engineering and Applied Sciences (SEAS) show a non-surgical injection of programmable biomaterial that spontaneously assembles*in vivo* into a 3D structure could fight and even help prevent cancer and also infectious disease such as HIV.

Tiny biodegradable rod-like structures made from silica, known as mesoporous silica rods (MSRs), can be loaded with biological and chemical drug components and then delivered by needle just underneath the skin. The rods spontaneously assemble at the vaccination site to form a three-dimensional scaffold, like pouring a box of matchsticks into a pile on a table. The porous spaces in the stack of MSRs are large enough to recruit and fill up with dendritic cells, which are "surveillance" cells that monitor the body and trigger an immune response when a harmful presence is detected.
Nano-sized mesoporous silica particles have already been established as useful for manipulating individual cells from the inside, but this is the first time that larger particles, in the micron-sized range, are used to create a 3D *in vivo* scaffold that can recruit and attract tens of millions of immune cells. Synthesized in the lab, the MSRs are built with small holes, known as nanopores, inside. The nanopores can be filled with specific cytokines, oligonucleotides, large protein antigens, or any variety of drugs of interest to allow a vast number of possible combinations to treat a range of infections.

The researchers are focusing on developing a cancer vaccine, in the future they could be able to manipulate which type of dendritic cells or other types of immune cells are recruited to the 3D scaffold by using different kinds of cytokines released from the MSRs. By tuning the surface properties and pore size of the MSRs, and therefore controlling the introduction and release of various proteins and drugs, they can manipulate the immune system to treat multiple diseases. Once the 3D scaffold has recruited dendritic cells from the body, the drugs contained in the MSRs are released, which trips their "surveillance" trigger and initiates an immune response. The activated dendritic cells leave the scaffold and travel to the lymph nodes, where they raise alarm and direct the body's immune system to attack specific cells, such as cancerous cells. At the site of the injection, the MSRs biodegrade and dissolve naturally within a few months.

So far, the researchers have only tested the 3D vaccine in mice, but have found that it is highly effective. An experiment showed that the injectable 3D scaffold recruited and attracted millions of dendritic cells in a host mouse, before dispersing the cells to the lymph nodes and triggering a powerful immune response.

The vaccines are easily and rapidly manufactured so that they could potentially be widely available very quickly in the face of an emerging infectious disease. "Researchers anticipate 3D vaccines could be broadly useful for many settings, and their injectable nature would also make them easy to administer both inside and outside a clinic,"

Since the vaccine works by triggering an immune response, the method could even be used preventatively by building the body's immune resistance prior to infection. Injectable immunotherapies that use programmable biomaterials as a powerful vehicle to deliver targeted treatment and preventative care could help fight a whole range of deadly infections, including common worldwide killers like HIV and Ebola, as well as cancer. These injectable 3D vaccines offer a minimally invasive and scalable way to deliver therapies that work by mimicking the body's own powerful immune-response in diseases that have previously been able to skirt immune detection.

www.wyss.harvard.edu

Smart Windows' have Potential to Keep Heat Out and Save Energy

Windows allow brilliant natural light to stream into homes and buildings. Along with light comes heat that, in warm weather, we often counter with energy-consuming air conditioning. Now scientists are developing a new kind of 'smart window' that can block out heat when the outside temperatures rise. The advancement could one day help consumers better conserve energy on hot days and reduce electric bills.

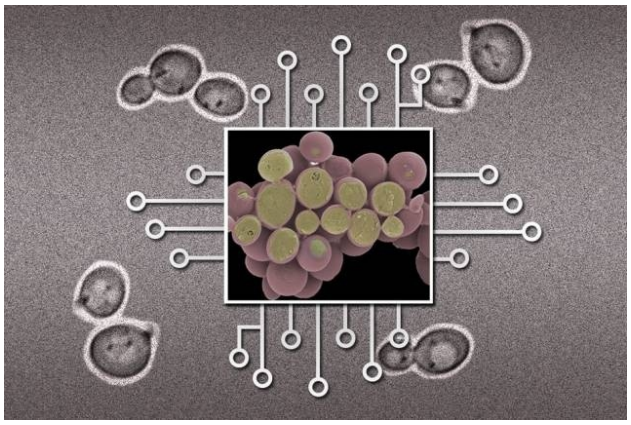
The researchers are pursuing smart windows that can respond to a variety of cues, including electricity, gas, light and heat. Those that are sensitive to heat are particularly useful for cutting down on energy use when it gets hot outside, the windows turn an opaque white to block unwanted heat from entering a building while still allowing light to pass.

They become transparent again as temperatures drop. But current methods for making these windows use jelly-like materials called hydrogels that swell in the heat, which hurts performance. Guo's and Gao's teams wanted to address this flaw. Building on previous advances, the researchers made a version of the hydrogels, but in the form of microscopic soft beads suspended in a liquid. They sandwiched the solution between two pieces of glass and tested it using a model house. When they shined a lamp mimicking solar light on the smart window, it turned opaque and kept the inside of the house cool. The microgel, however, didn't swell as much as its predecessor. The researchers conclude that their new microgel is a good candidate for use in future smart windows.

www.acs.org

Enabling Biocircuits: New Device could Make large Biological Circuits Practical

Researchers have made great progress in recent years in the design and creation of biological circuits systems that, like electronic circuits, can take a number of different inputs and deliver a particular kind of output. But while individual components of such biological circuits can have precise and predictable responses, those outcomes become less predictable as more such elements are combined.



A team of researchers at Massachusetts Institute of Technology has now come up with a way of greatly reducing that unpredictability, introducing a device that could ultimately allow such circuits to behave nearly as predictably as their electronic counterparts. There are many potential uses for such synthetic biological circuits and the specific one they are working on is biosensing.The cells that can detect specific molecules in the environment and produce a specific output in response. Another example is cell that could detect markers that indicate the presence of cancer cells, and then trigger the release of molecules targeted to kill those cells.

It is important for such circuits to be able to discriminate accurately between cancerous and noncancerous cells, so they don't unleash their killing power in the wrong places, Weiss says. To do that, robust information-processing circuits created from biological elements within a cell become "highly critical. The problem arises is that unlike in electronic circuits, where one component is physically connected to the next by wires that ensure information is always flowing in a particular direction, biological circuits are made up of components that are all floating around together in the complex fluid environment of a cell's interior. Information flow is driven by the chemical interactions of the individual components, which ideally should affect only other specific components. But in practice, attempts to create such biological linkages have often produced results that differed from expectations. To address this problem, the researchers produced a device called a load driver, and its effect is similar to that of load drivers used in electronic circuits. It provides a kind of buffer between the signal and the output, preventing the effects of the signaling from backing up through the system and causing delays in outputs.

While this is relatively early-stage research that could take years to reach commercial application, the concept could have a wide variety of applications, the researchers say. For example, it could lead to synthetic biological circuits that constantly measure glucose levels in the blood of diabetic patients, automatically triggering the release of insulin when it is needed.

www.tumblr.com

In World First, Researchers Convert Sunlight to Electricity with over 40 Percent Efficiency

Australia's solar researchers have converted over 40 percent of the sunlight hitting a solar system into electricity, the highest efficiency ever reported. A key part of the prototype's design is the use of a custom optical bandpass filter to capture sunlight that is normally wasted by commercial solar cells on towers and convert it to electricity at a higher efficiency than the solar cells themselves ever could. Such filters reflect particular wavelengths of light while transmitting others.

The researchers hope to see this home grown innovation take the next steps from prototyping to pilot scale demonstrations. Ultimately, more efficient commercial solar plants will make renewable energy cheaper, increasing its competitiveness."

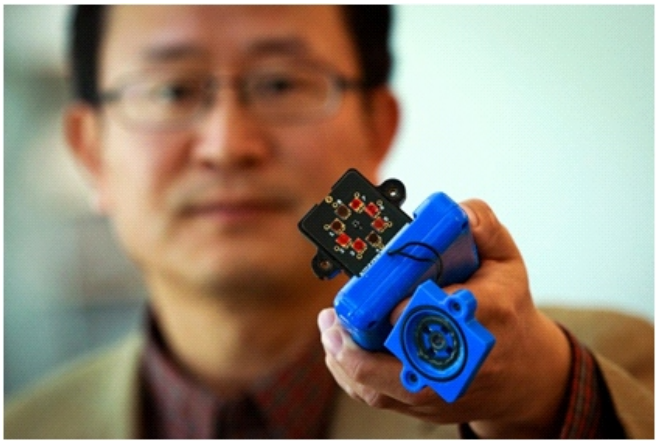
This is the highest efficiency ever reported for sunlight conversion into electricity. The scientists used commercial solar cells, but in a new way, so these efficiency improvements are readily accessible to the solar industry.

The 40% efficiency milestone is the latest in a long line of achievements by UNSW solar researchers spanning four decades. These include the first photovoltaic system to convert sunlight to electricity with over 20% efficiency in 1989, with the new result doubling this performance. The new results are based on the use of focused sunlight, and are particularly relevant to photovoltaic power towers being developed in Australia

www.sciencealert.com

Better Bomb-Sniffing Technology

University of Utah engineers have developed a new type of carbon nanotube material for handheld sensors that will be quicker and better at sniffing out explosives, deadly gases and illegal drugs. A carbon nanotube is a cylindrical material that is a hexagonal or six-sided array of carbon atoms rolled up into a tube. Carbon nanotubes are known for their strength and high electrical conductivity and are used in products from baseball bats and other sports equipment to lithium-ion batteries and touch screen computer displays. Vaporsens, a university spin-off company, plans to build a prototype handheld sensor by year's end and produce the first commercial scanners early next year.



The new kind of nanotubes also could lead to flexible solar panels that can be rolled up and stored or even "painted" on clothing such as a jacket, he adds. The team found a way to break up bundles of the carbon nanotubes with a polymer and then deposit a microscopic amount on electrodes in a prototype handheld scanner that can detect toxic gases such as sarin or chlorine, or explosives such as TNT.

When the sensor detects molecules from an explosive, deadly gas or drugs such as methamphetamine, they alter the electrical current through the nanotube materials, signaling the presence of any of those substances, Zang says. One can apply voltage between the electrodes and monitor the current through the nanotube. If there is explosives or toxic chemicals caught by the nanotube, one will see an increase or decrease in the current. By modifying the surface of the nanotubes with a polymer, the material can be tuned to detect any of more than a dozen explosives, including homemade bombs, and about two-dozen different toxic gases.

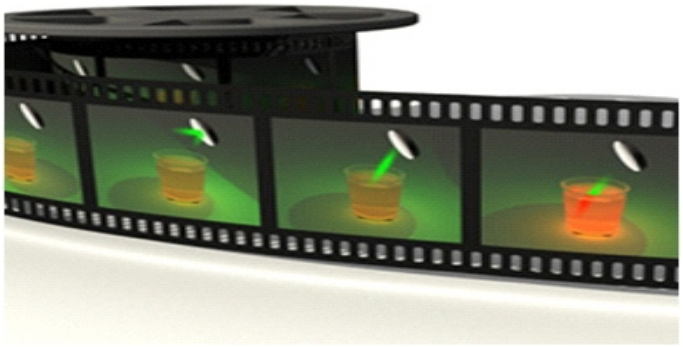
The technology also can be applied to existing detectors or airport scanners used to sense explosives or chemical threats. The scanners with the new technology could be used by the military, police and private industry focused on public safety.

Unlike the today's detectors, which analyze the spectra of ionized molecules of explosives and chemicals, the Utah carbon-nanotube technology has four advantages likely It is more sensitive because all the carbon atoms in the nanotube are exposed to air, so every part is susceptible to whatever it is detecting, it is more accurate, it has a faster response time. While current detectors might find an explosive or gas in minutes, this type of device could do it in seconds, it is cost-effective because the total amount of the material used is microscopic.

World's Fastest 2-D Camera, 100 Billion Frames per Second, may Enable New Scientific Discoveries

A team of biomedical engineers at Washington University in St. Louis, has developed the world's fastest receive-only 2-D camera, a device that can capture events up to 100 billion frames per second.

That's orders of magnitude faster than any current receive-only ultrafast imaging techniques, which are limited by on-chip storage and electronic readout speed to operations of about 10 million frames per second. Using the Washington University technique, called compressed ultrafast photography (CUP), Wang and his colleagues have made movies of the images they took with single laser shots of four physical phenomena: laser pulse reflection, refraction, faster-than light propagation of what is called non-information, and photon racing in two media. While it's no day at the races, the images are entertaining, awe-inspiring and represent the opening of new vistas of scientific exploration.



This technique advances the imaging frame rate by orders of magnitude. Each new technique, especially one of a quantum leap forward, is always followed by a number of new discoveries. It is hoped that CUP will enable new discoveries in science. This camera doesn't look like a Kodak or Cannon; rather, it is a series of devices envisioned to work with high-powered microscopes and telescopes to capture dynamic natural and physical phenomena. Once the raw data are acquired, the actual images are formed on a personal computer; the technology is known as computational imaging.

This is an exciting advancement and the type of groundbreaking work. These ultrafast cameras have the potential to greatly enhance our understanding of very fast biological interactions and chemical processes and allow us to build better models of complex, dynamical systems. Its immediate application is in biomedicine.

One of the movies shows a green excitation light pulsing toward fluorescent molecules on the right where the green converts to red, which is the fluorescence. By tracking this, the researchers can get a single shot assessment of the fluorescence lifetime, which can be used to detect diseases or reflect cellular environmental conditions like pH or oxygen pressure. CUP photographs an object with a specialty camera lens, which takes the photons from the object on a journey through a tube-like structure to a marvelous tiny apparatus called a digital micromirror device (DMD), smaller than a dime though hosting about 1 million micromirrors, each one just seven by seven microns squared. There, micromirrors are used to encode the image, then reflect the photons to a beam splitter which shoots the photons to the widened slit of a streak camera. The photons are converted to electrons, which are then sheared with the use of two electrodes, converting time to space. The electrodes apply a voltage that ramps from high to low, so the electrons will arrive at different times and land at different vertical positions. An instrument called a charge-coupled device (CCD) stores all the raw data. All of this occurs at the breathtaking pace of 5 nanoseconds. One nanosecond is a billionth of a second.

Forthcoming Tech Events

National/International Events

4th Invention to Innovation Summit 2015
5-6, March, 2015
Lahore, Pakistan
www.pastic.gov.pk/ www.irp.edu.pk

Conference on Value Addition and Innovation in Textiles (COVITEX 2015)
13-15, March, 2015
Faisalabad, Pakisan
www.covitex.net

1st National Research Conference
14-15, March, 2015
Islamabad, Pakisan
www.asmmr.com

13th International Exhibition for the Energy Industry
23-25, April, 2015
Karachi, Pakistan
Www.pogeepakistan.com

4th International Conference on Mathematics & Information Science
5-7, Feburary 2015
Zewail City, Cairo, Egypt.
www.ams.org

The International Conference On Advances in Applied Science and Environmental Technology - ASET 2015
21-22, Feburary, 2015
Bangkok, Thailand
www.scirp.org

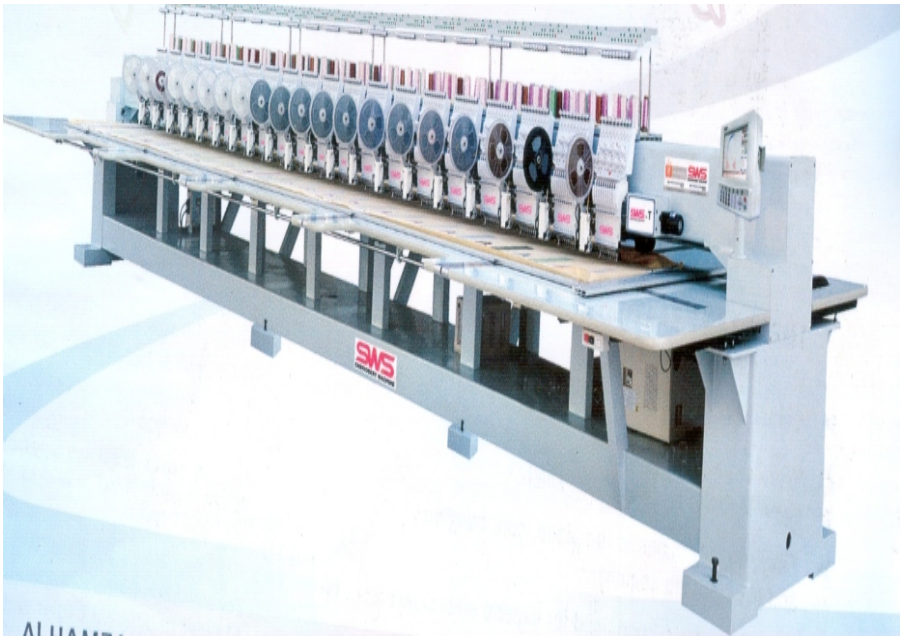
Energy Materials Research Conference EMR 2015
25-27, February 2015
Madrid, Spain
www.wikicfp.com

Pharmaceutics & Novel Drug Delivery Systems
16-18, March, 2015
Crown Plaza, UAE
www..noveldrugdelivery

Tech & Trade Offers

High Speed
Flat Multi Head Automatic Embroidery Machine

New Embroidery Generation, Sequins, Cording, Chunille & Max Embroidery from 1 to 56 Heads with SQ300



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- Easy run possibilities to run plane, cup, hanging, & over lapping sequins.
- High speed 1200 RMP plane embroidery machine.
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- The Machine can store a maximum of 100 design.
- The basic Memory size is 10 Million stitch.

Company Contact:-

Al-Hamza International
Ali Raza Abad, Main Raiwind Road, Lahore, Pakistan
Tel: 92-42-32876110,5320086, Fax: 92-42-5320087
alhamzaint@gmail.com

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