

TECHWATCH LANKA

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Technology Foresight, the latest tool for shaping the future.

The process of technological change is very rapid. It may create problems, but it also creates options for society, providing new capabilities, new choices and new solutions to old problems. Utilizing technology, it is possible to shape the future rather than simply preparing for a future. Technology foresight helps to look ahead and consider the role that may be required of science and technology in the future.

Technology foresight is a systematic attempt to look into the long-term future of science, technology, economy, environment and society with a view to identifying emerging generic technologies which could yield greatest economical and social benefits.

The importance of Technology Foresight

- Successful exploitation of technology has become critical in achieving economic competitiveness.
- The world is changing rapidly resulting in global environmental issues such as “Global Warming”
- To keep pace with these changes and to achieve a competitive edge, our science and technology systems should be able to respond by adapting existing technologies or developing and applying new ones.

The outputs of Technology Foresight is represented by six Cs namely, communication, concentration, coordination, consensus, commitment and comprehension. The good example is Korea, a newly industrialized country. Technology Foresight has been used by Korea over the past three decades. At present, it is used in prioritizing research areas, R&D resource allocation and science and technology policy-making. In addition, Technology Foresight is being practiced by countries such as Thailand and Japan. Thailand has a separate institute called “APEC Centre for Technology Foresight” which is engaged in foresight activity.

The demands of industry for more effective ways of addressing the future continues to grow. Three distinct driving forces related to industry/business are technology, globalization of business and unprecedented growth of total material throughput due to all industrial activity on a global scale. These demands and forces gives a great emphasis on developing new approaches for managing the future.

TWC staff training on “Technology Watching” at the School Of Management of the Asian Institute of Technology (AIT) in Thailand.

Three Scientific Officers at TWC/NSF attended a one month training program on Technology Watching arranged by the AIT. The objective of the program was to train the TWC staff in the areas of Technology Watching (Technology information collection and dissemination) and Technology Management. During their training, the staff visited the APEC Centre for Technology Foresight, National Science and Technology Development Agency (NSTDA) and the Intellectual Property Dept. of Thailand. These visits and the training itself have been useful for the staff’s skills development and establishing international links with the above institutes which are engaged in technology information.



TWC staff with the staff of the Intellectual Property Dept., Thailand.

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Harnessing Biotechnology for Aquaculture

The increase in aquaculture production, particularly the expansion into intensive and semi-intensive methods of production, has been paralleled by an increase in fish diseases, resulting from high stocking densities and stress conditions that favor the occurrence and spread of infectious diseases. For example, continued development of the shrimp farming sector is constrained by a wide variety of reasons including:

- (1) Recurrent disease epizootic with limited prevention and control measures
- (2) Lack of consistent broodstock management and post-larvae quality.
- (3) Limited choices of feed and inadequate water quality control.

Controlled breeding programs and genetic markers are now being developed to enhance selection of genetic lines, which are free of specific pathogens. Advances in understanding of shrimp immunity are also assisting development of immunostimulants and vaccines. Broodstock and post-larval quality are being improved through application of hormonal control of reproduction and development of genetic tags to identify and produce pedigrees with optimal health and productivity. Feed enhancement using micro-encapsulation of nutrient supplements and pro-biotic may also play a role in enhancing quality of post-larvae.

Bioremediation, recirculation and biofiltration technology all show promise for improving water quality control.

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An ideal source for vital information on the current issues in aquaculture

“Global Aquaculture Advocate”, an international magazine on aquaculture pro

-vides information under the following technologies.

- i)Genetic Improvement of *Tilapia* at Commercial RAS
- ii)IMBC Develops Computer-Based Feeding System
- iii)Bioencapsulated Artemia Show Promise for Therapeutant Delivery to Young Fish
- iv)Recirculation Systems for Shrimp Broodstock Maturation
- v)Design & Modeling: Zero-Exchange Shrimp Production

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www.gaalliance.org/maga.html

Biotechnology and Business Creativity for successful shrimp culture

Setting up a marine shrimp cultivation biotechnology company is a recent innovation in the shrimp farming technology. Essential technologies include white shrimp culture technique that grows shrimp at a density equal to and beyond 20kg per square meter of land use. This high-density technique is the foundation of production in specific pathogen free (SPF) broodstock, breeding with marker assisted technology and cultivation with bio-secure re-circulation design. All essential technologies are carried out by this biotech company. With this new biotechnology, shrimp are produced in wide-range of salinity allowing for variable production sites. Shrimp growing greenhouses can be installed on either salty fields or freshwater farm land and compact shrimp factories can be built in warehouses located on tourist attractions and suburbs next to consumer markets. The production can be operated as chain factories/farms with products (value-added packages of live, cut and cooked shrimp) sold directly through restaurants, home-delivery services or convenient stores. The opportunity is to replace the currently viral-tainted marine shrimp production with a business supplying virus-free marine shrimp seeds and equally clean consumer products. To remain competitive, this new business continuously imp

-roves itself through modern breeding, high-tech bio-secure cultivation and e-commerce coordination. With biotechnology developments in disease control and genetic improvements, these factories produce high-quality organic shrimp. The products are then delivered through a modularized system that includes a live shrimp transportation, storage and display units for direct sale.

More information :

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www.aquatechgroup.com

Environmentally sound and economically viable technologies to raise *Tilapia*, Carp and Catfish.



The SEAFDEC Aquaculture Department in the Philippines has worked on broodstock development and management, hatchery techniques, nursery and grow-out systems, and feeds for Nile *Tilapia* (*Oreochromis niloticus*), big head carp (*Aristichthys nobilis*), and the native catfish (*Clarias macrocephalus*). It has likewise conducted studies on selective breeding, genetic characterization, and strain evaluation of Nile *Tilapia*. Appropriate technologies that do not adversely affect the environment have been tested on-farm, with the collaboration of farmers and later it has been transferred to other fish farmers as well. Selective breeding of Nile *Tilapia* and red *Tilapia*, and refinement of hatchery and grow-out management schemes also have been practiced.

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Environmentally Friendly Marine Shrimp Cultivation Machines

In the future, it will be possible to produce marine shrimp in culture machines, housed in warehouse-style buildings or installed in closed outdoor ditches. The Aqua Technologies Group inc., has come up with this new machine, as the traditional pond culture systems worldwide have faced a failure, specially due to outbreak of diseases. With the new machine, the solid waste collected by the physical filtration can be packed and buried, soluble nitrogenous waste is treated within the machine and converted into algae or bacterial sludge. The small amount of water discharged is sent to properly designed oxygenation ponds for evaporation or recycled by a new membrane filtration technique. To enhance its cost effectiveness, culture pans and nitrification troughs have been introduced, that are made up of flexible plastic and PVC sheets instead of solid fiberglass and polyethylene materials. The most significant part of this new model is its solar energy driven nitrogenous waste removal system. The solar component of this new design has come from the Ditch Farm concept.

The components of culture machines are,

1. Life-support system

A photosynthetic bed, which utilizes light-driven activities of certain algae to remove carbon dioxide and nitrogenous waste including ammonia.

2. Cultivation components.

The cultivation components are designed for controlling water flow, lighting and to meet the fast particulate removal requirement of the life-support system ensuring a high-density shrimp cultivation technique.

3. Sets of high-density shrimp cultivation apparatus.

This apparatus are specially designed Eco-plates to keep shrimps in a tight-packed living mode.

More information :

Aqua Technologies Group, Inc.

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www.aquatechgroup.com

A new Sulphur nitrate filter



Sulphur nitrate filter is adequate for an aquarium of up to 500 liters in capacity. The sulphur nitrate filter is a new product from Ratz Aquarientechnik. It has been developed to allow problem-free removal of nitrate compounds from seawater aquariums. The level of efficiency is many times greater than that of a conventional nitrate filter which means that you can achieve the same performance with a small device as you would with a conventional nitrate filter. Another feature of the new filter is the fact that it does not require any additional nutrient solution to feed the bacteria. You simply connect up the sulphur nitrate filter to the bypass on your pressure line from the filter to the aquarium.

More information:

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www.SeaMe.com

TEXTILE TECHNOLOGY

New Full-color Digital Label Printer for instant printing of product Labels



A new 4-color digital label printer has been introduced by the QuickLabel Systems Product Group of Astro-Med Inc. The printer is a 4th generation full-color digital label printer, utilizing thermal transfer printing technology, designed for in-house use. The new printer produces labels and tags instantly, in full process

color, without printing plates. It satisfies the growing demand of large and small companies to produce custom labels on a just-in-time basis, in-house, cost-effectively for both small and large quantities of labels. This VIP (Variable Information Printing) printer is ideally suited for companies that require fast turnaround of products labeled with both graphic branding and tracking information. It's applications include printing of labels, tags, and package inserts. The printer is also ideal for e-fulfillment of consumer and industrial products, custom, color-coded product tracking labels. Companies can print attractive product labels on site and eliminate inventories of printed labels.

According to the company, anyone with an ordinary PC can produce striking color labels in minutes. Hundreds of label formats designed can be stored in the computer and called up for printing instantly. More information:

QuickLabel Systems West Warwick,
Tel: 877-757-7978, Fax : 401-822-2430

Single Pass Fabric Inspection Machine for high efficiency

This machine allows the operator to inspect both the sides of the Tubular Knitted Fabric in a single pass thus resulting in time saving significantly. The ALMAC in India has developed this machine with a special design to inspect Tubular Knitted Fabrics, both Grey and Finished in a tensionless way without allowing any shrinkage. This machine can handle fabrics in both rolls and plaits. The manufacturer declares that they can change the way of manufacturing it as to suit buyers needs.



The advantages of the machine over traditional inspection machines are,

- i) It allows tensionless unwinding of the fabric.
- ii) Simultaneous inspection of both the sides of a knitted fabric in a single pass
- iii) Inspection is more than twice as fast as traditional inspection machines.
- iv) Time required for unloading / re-threading in inspection of the second side in traditional machines is also saved.
- v) It winds rolls by 25% tighter than the traditional winding mechanisms and winding is completely tensionless.

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Naturally recyclable fibres

A book has been published which provides up-to-date information on the chemistry, physics, process technology, applications and markets for man-made cellulose fibers. It covers the properties and applications of viscose rayon, cuprammonium rayon and the new solvent-spun fibers as well as considering their relationships with the natural celluloses such as cotton and the synthetic polymer fibers such as polyester. It gives an overview of the naturally recyclable fibers and the latest manufacturing techniques that are being developed to produce them will be of interest to professionals in textile production, research and development, manufacturing chemists and textile technologists. The non-woven and paper industries that use cellulose as a basic ingredient of their products will also find it valuable as will medical textiles producers and geotextiles engineers.

More information :

info@woodhead-publishing.com

<http://www.woodhead-publishing.com>,

Three-In-One Inspection Systems for high efficiency and productivity

The Three-In-One Inspection System completes the processes of Mapping, Automatic Cutting and Re-inspection of the fabric. It allows you to inspect and separate out first, second and third quality of rolls. Using this system, automatic cutting of fabric rolls at high speed is

possible.



You can have gray inspection right at your fabric forming machine if you combine it with the Large Roll Take-up System. After the complete fabric has been examined, a special software optimizes the defect data to generate a cut-map. The cut-map generated is the most efficient method of cutting the fabric so as to optimize the revenue generated by the sale of the fabric. Once the cut map is generated, the fabric roll is handled by Automatic Cutting machine, which is a versatile machine to localize the cut-map, which then begins automatically cutting of the fabric. The operator on this machine is thus only Re-Inspecting the fabric and pushing the start button every time a cut is complete. Up to three batches are optional for first and second quality with additional flexibility to obtain rolls

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A new high tech vest to keep soldiers and emergency workers alive

Australian scientists have invented a new high tech vest to keep soldiers and emergency workers alive in the searing temperatures of deserts, mines and major fires. The vest uses a personal cooling system (PCS). It is designed to be worn by military personnel, underneath nuclear, biological and chemical clothing, body armour and other protective uniforms, by emergency services workers wearing protective clothing and by miners working underground. Personal Cooling System will allow soldiers to operate up to four hours in high temperatures. The PCS is based on new patented heat pipe technology, where collecting body heat through vapour filled cavities in the vest and transferred via an evaporative cooling heat exchanger to the atmosphere

The PCS is expected to have major applications in fire-fighting, deep mining operations, hazardous chemical clean-ups in industrial operations in harsh environments and in military operations where high temperatures currently limit strenuous physical exertion to very short periods of time.

More information:

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Clean and efficient Plasma Technology for sustainable Textile Industry

A group of European scientists and industrialists together with Institute of Fibre and Polymer Technology Research (IFP) in Sweden are on the point of demonstrating the feasibility of a technology of the future textile processing using plasmas at atmospheric pressure. This development meets new needs in the industry. Unlike liquid processes, plasma produces no more than a surface reaction, the properties it gives the material being limited to a surface layer. These properties applied to both natural fibers and polymers, as well as to non-woven fabrics, without having any effect on their internal structures. Plasma processing makes it possible to impart hydrophilic or hydrophobic properties to the surface of a textile, or reduce its inflammability. The new technology avoids the difficulty in dyeing of synthetic fabrics, as it involves reactive polar functions resulting improved pigment fixation. Finally, with plasma containing fluorine, which is used mainly to treat textiles for medical use, it is possible to optimise biocompatibility and haemocompatibility medical implants containing textiles. Other advantages of plasma technologies over traditional liquid chemical processes are low consumption and minimum pollution of water resources, minimizing waste-processing costs, reduction of energy consumption as the plasma technology involves dry processing and its speed is higher than wet processing.

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Modified corn starch

The Grain processing corporation of Iowa, the United States, has introduced Inscosity™ modified food starch, a new instant ingredient. Inscosity is a functional cold water –swelling corn starch designed to provide viscosity without heating or cooking. It maintains a clean flavour and ultra-smooth surface appearance with clarity and sheen. It provides excellent freeze/thaw and steam table stability without syneresis. Undesirable lumps or fish-eyes can form when the system hydrates unevenly. Inscosity is ideal for hot or cold water dispersible applications especially those where sugars, salt or other dry solid ingredient usage levels are minimal and ease of mixing is needed. It can also optimize formulations by providing texture and body, and reduce levels of expensive gums, hydrocolloids or fruit solids. The fine-powdered starch dry-blends easily without loss of bulk density or particulate identity. Inscosity is designed for a wide range of neutral to mildly acidic applications where convenience, cost savings and customer satisfaction are vital. For more information:

www.worldfoodnet.com

DuPont Qualicon Releases New Test Kits for Biotech Foods

DuPont Qualicon has introduced the first in a series of test kits that food processors can use themselves to determine if biotech ingredients are present in food products. The kits will enable food processors to easily and inexpensively establish systems to ensure the authenticity of ingredients in the supply chain. Unlike tests for proteins that can be broken down by heating and other food processing, the Qualicon test kits look for specific DNA sequences that can be detected with equal ease in raw materials, ingredients and finished products.

The **BAX® System PCR Assay for Screening Qualitative GMO** can indicate whether a sample contains a threshold level of genetically enhanced components.

For more information
www.qualicon.com.

Electronic Tongue

A hand –held electronic tongue-developed by Mr. Antonio Riul of EMBRAPA Instrumentacao Agropecuaria in Sao Carlos, Brazil, and his colleagues promises to give accurate and reliable taste measurements for companies that currently depend on human tasters for quality control of tea, coffee, wine, mineral water and other beverages. The device is more efficient than the human tongue, which tends to saturate after a while and thus lose its discriminating edge. The electronic tongue can sense low levels of impurities in water. It can discriminate between different vintages from the same winery and between same vintages from two different wineries.

It can also spot molecules such as sugar and salt at concentrations too low for human detection. Humans have long been thought to detect four basic tastes: sweet, salty, sour and bitter. Very recently, a fifth taste type was identified: umami, the taste of monosodium glutamate, characteristic of protein rich foods.

A composite sensor that incorporates all four, therefore, produces an electronic fingerprint of the taste.



This can be recommended in to single datapoint on a graph, with the position on the graph reflecting the taste: sweet to the top left, sour towards top right, etc. Different beverages would thus have their characteristic location on the graph.

Source: Vatis Update.

Baking and Bread Improvers

In bread production, a knowledge of both the alpha-amylase content and the water absorption of the flour are essential. Heavy rainfall and high humidity at the time of harvesting leads to preharvest sprouting, and the synthesis of amylase. High levels of this enzyme in flour leads

to excessive starch dextrinisation in the baking process, which results in a sticky loaf, which is difficult to slice. Water added to flour is absorbed by protein, pentosans and starch. The major variable affecting water absorption is the level of damaged starch granules produced during the milling of the grain. In modern baking practices the endogenous flour enzymes are commonly supplemented with enzymes of microbial origin e.g. alpha-amylase, xylanase, and in some cases, proteases. Xylanase, through the modification of wheat flour arabinoxylans, can give up to a 10% increase in loaf volume. Proteases can be added to soften, particularly tough (bucky) glutes. However, high protease levels will destroy the gluten properties.

Xylazyme AX finds widespread application in the measurement of xylanase in wheat flours and bread improvers mixtures. alpha-amylase is routinely measured using Ceralpha: alpha-amylase assay reagent. The need for rapid and simple procedures for the measurement of protease in bread improvers mixtures lead to the development, by Megazyme of **Protazyme AK Tablets** and **Azo-Casein**.

For more information:

<http://www.megazyme.com>

Putting the squeeze on long-life orange juice

New research is aiming to bring fresher tasting, additive-free orange juice with a long refrigerated shelf-life. Food Science Australia, in partnership with US-based Flow International Corporation, is researching the use of high pressure processing (HPP) to kill the food spoilage microbes such as yeast, bacteria and mould that cause off-flavours in aging orange juice.

According to Jay Sellahewa, project leader at Food Science Australia "HPP involves subjecting the orange juice to intense pressure that causes fatal damage to the outer cell membrane of the microbes. The pressure causes only minimal damage to the orange juice because the water contained in the juice is relatively incompressible. The microbes are killed leaving a safe product that is free of additives and retains its fresh taste." HPP is an innovative alternative to thermal-treatment or chemical preservatives, which can sometimes adversely affect the flavour, colour and composition

of orange juice. The HPP of the orange juice takes place after the juice has been bottled, reducing the risk of contamination after packaging. The bottles of orange juice are subjected to 600 megapascals (MPa) of pressure for 60 seconds.

According to Mr.Sellahewa HPP is already being commercialized in the United States, Japan and Europe.“To reduce the risk of food poisoning, food safety regulatory bodies are increasing demands on processors. Following stricter requirements in the United States, ANZFA (Australian New Zealand Food Authority) has proposed that all orange juice, other than freshly squeezed juice for immediate consumption, is thermally-treated or adequately labeled to inform consumers of risks associated with drinking untreated juice.”The research team from Food Science Australia is comparing the quality of HPP, thermally-treated and fresh orange juice kept over three months in different storage conditions. Sensory panellists taste the orange juice and evaluate its flavor, aroma and appearance. This provides an indication of consumer acceptability of juice and its potential performance in the marketplace.



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Snack food producers find a new way to generate MAP gas

Advanced nitrogen gas generators that can dispense with the need for high-pressure cylinders or liquefied gas storage in modified atmosphere food processing applications are being introduced by Domnick Hunter. The MAXIGAS range of continuous nitrogen generators are suitable for MAP gas flushing applications for products such as snack foods, where they can extend product shelf life without preservatives, maintaining taste and freshness while cutting the cost of gas needed to produce these benefits.

“Productivity is also considerably boosted by eliminating the time and effort spent changing cylinder packs or eliminating tanker deliveries of liquefied gas,” according to Domnick Hunter. MAXIGAS generators offer an uninterrupted, reliable and safe source of nitrogen gas 24 hours a day for industrial production and testing applications as diverse as heat treatment, modified atmosphere packaging, beverage dispensing, pressure transfer of raw materials, inerting of chemical storage and blanketing of can welding operations.

Domnick Hunter says that “While eliminating the need for the storage, multiple manhandling and continual changing of bulky gas cylinders, the generators respond efficiently to the needs of the increasing number of manufacturers using gas for product processing applications. In addition to the enhancement of product sales appeal by preserving taste and freshness, efficient gas flushing allows the use of centralized packaging and distribution facilities.

For more information
www.domnickhunter.com.
 Source: Businesswire.com

BIOTECHNOLOGY & ENVIRONMENTAL SCIENCE & TECHNOLOGY

Potent anti-bacterial enzyme isolated

An enzyme that kills the potentially dangerous bacterium *Streptococcus pneumoniae* has been isolated by a US team. A nasal spray containing the enzyme could be an effective alternative to conventional antibiotics, and could help wipe out human reservoirs of the bug, the team says. Vincent Fischetti and colleagues at Rockefeller University in New York isolated the enzyme, called Pal, from a bacteriophage (a type of virus that infects bacteria) that targets *S. pneumoniae*.

Earlier this year, Fischetti’s team isolated another bacteriophage enzyme that kills streptococci, the bacteria responsible for strep throat. The same method could also be used to find enzymes that kill other bacteria. “Every bacteria has a bacteriophage system,” Fischetti says. *S. pneumoniae* lurks in the nose and throat of half the human population and is a sig-

nificant source of illness and death worldwide. It can cause problems ranging from ear infections to potentially deadly diseases like pneumonia and meningitis.

“Exciting opportunity”

In test tube experiments, Pal killed 15 strains of *S. pneumoniae* within seconds of contact, but did not interfere with other, harmless, bacteria that grow in the nose and throat, or with human cells. The enzyme also proved effective against *S. pneumoniae* when applied to the noses of infected mice.

Fischetti is now planning clinical trials to test a nasal spray containing Pal. He says the spray could be used periodically, say once a week, to keep bacteria under control. “I think it’s an exciting opportunity for both prevention and treatment,” says Cynthia Whitney, an epidemiologist at the Center for Disease Control in Atlanta. She says the spray might be especially useful in day care centres and nursing homes, where infections can spread

quickly from person to person.

Fischetti says Pal would be more effective than existing vaccines, which only protect against individual strains of *S. pneumoniae*. And because the enzyme is so deadly, the bacteria do not seem to be able to acquire resistance, as they have to antibiotic drugs, he says.

Journal reference: *Science* (vol 294, p 2170)
 New Scientist.com

Electronic ‘tongue’ for environmental monitoring

UK researchers are developing a unique electronic ‘tongue’ that can be dipped into rivers or industrial effluent streams to ensure that the water does not contain anything sinister. The researchers, based at Cardiff University’s School of Engineering, have demonstrated that the ‘tasting’ part of the system can be fabricated from very small components, making it poten-

tially easy and inexpensive to mass-produce. The next step would be to link the tongue to a computerized ‘brain’ to analyse the signals it generates. The work is being carried out by Professor David Barrow’s team, with funding from the Swindon based Engineering and Physical Sciences Research Council (EPSRC).

The system is based on an analytical technique called chromatography (a technique for separating mixtures). Here, the chemical sample, contained in a liquid or a gas, is passed through or over a solid ‘matrix’ which has a high surface area - for example a glass cylinder packed with silica beads. It is possible to attach a variety of chemical ‘hooks’ on to the beads, so that as the sample passes down the column of beads different components will be ‘grabbed’ by the hooks to differing extents. In this way the various components can be separated from the mixture and analysed. The Cardiff researchers’ system works on broadly similar principles, but on a much smaller scale. If a silicon chip is treated with hydrofluoric acid in a controlled way, it becomes etched with millions of tiny pores and channels, of dimensions of nanometres. “So if you etch a spot a millimetre square, you actually have several square metres of internal surface area,” says Professor Barrow. It is in effect a tiny chromatograph

-hic ‘extraction cartridge’.” You could put the system in a river or factory process stream to monitor the mixtures flowing through it,” says Professor Barrow.

For more information contact:
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New device removes drinking water contaminants

A Northwestern University environmental engineer has received a U.S. patent for a treatment device that renders perchlorate, a thyroid-damaging ingredient of rocket fuel and a drinking water problem harmless. The applications extend beyond the safety of drinking water and this one pollutant.

The cost-effective and environmentally friendly system also works on nitrate, a contaminant from agricultural fertilizers that can cause methemoglobinemia, or blue-baby syndrome, in infants. This simple method, which destroys the contaminant, should work for almost every oxidized pollutant, which means it has an incredible range of applications, including being used on more than drinking water.”

The decontamination process takes advantage of a community of microorganism

ms that lives as a biofilm on the outer surface of the membranes in the system. The microorganisms, found naturally, act as catalysts for the transfer of electrons from hydrogen gas to the oxidized contaminant, such as perchlorate or nitrate. Chemically speaking, the oxidized contaminants are eager to receive electrons, which reduces them to harmless products. The hydrogen gas supplies the electrons, and the biofilm microorganisms are the agents for the transfer. A bundle of 7,000 hollow-fiber membranes are in one of the pilot-study biofilm reactors, a column approximately 5 feet tall and 18 inches in diameter. Each membrane is like a long, very thin straw, only 280 micrometers in diameter (the width of a thick sewing thread). Hydrogen gas is fed to the inside of the membrane fibers, and the hydrogen diffuses through the membrane walls into the contaminated water that flows past the fibers. At this meeting point, on the outside of the membrane, bacteria attach to the surface because they gain energy from the process of transferring electrons and can grow and thrive. The contaminants are reduced to harmless end products, perchlorate to chloride and nitrate to nitrogen gas while the hydrogen gas is oxidized to water.

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RUBBER & POLYMER TECHNOLOGY

Malaysia Introduces New Rubber Technology

Malaysia hopes to remain as one of the world’s major rubber producers with the introduction of the low frequency tapping system known as “Reactorrim.”

It is hoped that the Reactorrim technology could rejuvenate the industry as it is not only capable of extending the life span of rubber trees but also raising productivity and income of rubber small holders.

The Reactorrim technology is a technique that stimulates rubber trees by using ethylene gas which is lowly and continuously absorbed into the bark by a short tapping system with a tapping frequency of three or four days.

For more information:
www.newsabahtimes.com.my/Februari/

Sitting Pretty on New Technology

Furniture maker Steelcase Inc. in Caledonia, Mich., loved the idea of a simple stacking chair with a seat and back that can move independently to fit the person sitting on it.



The chair would be too expensive to make in aluminum and too heavy with Steelcase’s traditional bent-steel tubes.

So Steelcase set out on a two-year R&D program to design the chair in plastic. It arrived at a novel combination of gas-assist molding with a long-glass composite

For more information:
www.plasticstechnology.com

“Breathable” film technology

A novel, multi-layered film structure and activation process has been developed and patented by CSIRO. The storage life of fresh produce can be extended by carefully matching the packaging film’s permeability to a particular product’s requirements. A large range of different polymeric films is currently used to address the packaging needs of fresh products sold in commercial outlets. This devel-

oped film has the potential to replace all these different films because fresh produce packagers would only need to keep one film stock - which could be activated according to the needs of each product - instead of a large array of films.

For more information:

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Australia.*

Rugged, Protective Bottle Jacket Ideal for Hazardous Liquid Shipping



Honeywell has come up with a unique, transparent bottle jacket that meets OSHA hazardous material handling requirements.

This virtually unbreakable, transparent bottle jacket features an integral, locking handle that prohibits the use of the bottle unless the handle is locked for safe use. The jacket's transparency enables all labels to be read and liquid levels checked easily through the protective, shatter-proof plastic. Design incorporates a low-density, transparent, solvent-resistant resin.

This protective cover is designed to be manufactured by injection or blow molding in virtually any shape or size, using common plastics such as polyethylene, polypropylene, polycarbonate, or polyethylene terephthalate (PET).

Because the bottle jacket is made from common, recyclable plastics and is easily removable, it enables both the jacket and the bottle to be recycled at the end of their useful lives. The manufacturing process enables a name or logo to be embossed easily in the mold, ideal for identifying the laboratory, the bottle contents, or the content manufacturer.

For more information :
www.yet2.com

New biodegradable packaging

CSIRO, with the Cooperative Research Centre for International Food Manufacturing and Packaging Science, has developed new biodegradable packaging materials based on starch.

These new packaging materials have been successfully practiced on full-scale equipment by several interested companies this year and commercial production of at least one application is anticipated. The benefits of these materials are two-fold: the raw materials are derived from a renewable resource, in contrast to the petrochemical-derived plastics currently used, and the starch-based materials will break down in compost heaps and thereby reduce the amount of packaging waste ending up in landfill.

For more information:

*Dr Gregor Christie, CSIRO Manufacturing S&T, Private Bag 33,
Clayton South 3169, Australia.*

Improving the quality of ZV-P protective wax

A mixture of petroleum jelly and a fraction of slack wax is used as the raw material for obtaining wax products by de-oiling. On addition of the slack wax fraction to the petroleum, conditions are created for an optimum ratio of paraffin hydrocarbons of normal and iso-structure in the wax product, which ensures reliable protection of the surface of rubber goods against ozone cracking.

Details are given of improvements made to the production technology of ZV-P protective wax, with reference to both the preparation of the raw material and to the de-oiling process in the plant.

Research was also carried out into the use of the 420-500 °C slack wax fraction without vacuum fractionation instead of the 380-500 degrees °C slack wax fraction in the composition of the raw material for ZV-P, and optimum blends were determined.

For more information:
www.ingenta.com

Water-Shrinkable Film

The famous American company Kimberly-Clark has developed unique shrinkable films; especially applicable to novel gaskets and seals, medical bandages, pharmaceutical delivery, and packaging

applications for food or horticulture that require changes to structural integrity when exposed to aqueous fluids.

The film shrinkage and potential disintegration result from the unique two-component system, where an elastomer is held in tension by a water-dispersible polymer during processing.

- Film shrinks without heat, changing shape/size, and conforms as desired to objects
- Structural changes (film to elastic) are permanent and provide new applications currently unavailable,
- Properties widely adjustable by two component

For more information :
www.yet2.com

New termination process enables cost-effective manufacturing of tunable optical fibers

Northrop Grumman has addressed this issue by changing the fiber geometry in the attenuation area during manufacture. By creating a tapered end, the light-absorbing layers are squeezed closer to the core, causing more light to escape the core and be absorbed by the secondary layer.

This phenomenon is called the "cladding mode" and occurs when light propagated in the intermediate region, or cladding, bounces around between the fiber's outer boundaries.

This can result in interference and eventual distortion of the core signal, but as the fiber tapers, the propagating light encounters the quenching region and is absorbed, significantly reducing the potential problem.

This is particularly important in "active" fibers—fibers that are doped with rare earth elements that internally generate light with characteristics of that particular element and absorb certain frequencies.

Excessive end reflections can create instability in the signal and degrade it. As the reflected light bounces back down the fiber, it reflects out into the intermediate region where the doped glass can absorb it.

For more information :
<http://www.yet2.com/app/insight/>

Computer aided optimum design of rubber recipe using uniform design

The application of Uniform design in rubber formulation and its corresponding Group Methods of Data Handling modeling and Simulated Annealing optimization methodology are investigated. The example of NR/VBR (vinyl polybutadiene rubber with 80% of vinyl content) blend in tyre tread shows that uniform design can distribute the experiment points evenly so as to establish mathematical models of high precision. With computer aided modeling and optimization technology, the optimum formulation can be predicted.

For more information :
www.ingenta.com

Influence of the polarity of ethylene–vinyl acetate copolymers on the morphology and mechanical properties of their uncompatibilised blends with polystyrene

Rubber-toughened polystyrene has been extensively studied and is a well established technology. However, the use of thermoplastic elastomers to toughen polystyrene (PS) is new and has the potential for further investigation. In the present study, three EVAs (ethylene–vinyl acetate copolymers) with identical melt flow indices (MFIs), of 2.5 dgmin⁻¹, but different vinyl acetate (VA) contents, of 9.3 wt% (EVA760), 18.0 wt% (EVA460) and 28.0 wt% (EVA265), were melt blended with PS at 180 °C, and various ASTM test pieces were injection moulded at 200 °C. The polarity of the dispersed phase (ie EVA), has a significant effect on the mechanical properties of the blends. Both mechanical and rheological studies reveal that the uncompatibilised PS/EVA265 blends exhibit some degree of compatibility when the amount of EVA265 is lower than 30 wt%. These results indicate that EVA265 with the highest VA content is the most effective impact modifier PS.

The results clearly show that increasing the VA content in EVA increases the polarity of the dispersed phase, approaching that of the matrix (i.e. PS) and subsequently improving the compatibility

between the two phases in terms of interfacial adhesion.

For more information :
www.ingenta.com

Sensor/Database Technology Minimizes Set-Up Time and Costs for High-Volume Consumer Packaging



United Biscuits has developed a packaging set-up technology that incorporates sensors and software. The company has perfected this technology to work with roll wrap, the most popular form of consumable product packaging utilizing plastic films. With this proprietary monitoring system, the automated heat-sealing packaging process is configured the right way to apply heat, pressure, and time to any particular film packaging job. This is done by incorporating sets of sensors in a dummy package. These sensors measure both temperature and pressure and monitor the various conditions created during the entire packaging process. This technology is ideal for virtually any food and personal care packaging using heat-sealed plastic film.

For more information :
www.yet2.com

Mixing conditions during the mixing of polymeric materials

An examination is made of the mixing process with reference to the mixing conditions relating to rubbers, which are determined by the size of the interface of the mixed components or by the interface-related overall shear strain. The use of powder technology for the preparation of rubber mixes and also mixing with the use of liquid rubbers is said to promote the most rapid reorientation of the interfaces of the systems being mixed.

For more information :
www.ingenta.com

Technology for obtaining bead rings from wire strand

The design is described of a tyre bead ring produced from coiled wire strand, and its advantages over the design of bead rings made from wires arranged in piles, are discussed. The coefficient of utilization of the strength is claimed to be higher for bead rings formed from coiled wire strand, making it possible to reduce the dimensions of the bead ring and the amount of metal used therein, whilst retaining strength characteristics.

For more information :
(Article translated from *Kauchuk i Rezina*, No.5, 2000, p.36)

Materials technology for reducing rolling resistance

Materials technology research and development, aimed at reducing fuel consumption by the reduction of rolling resistance in tyres is discussed, and with particular reference to the considerations which have to be made regarding the trade-off between rolling resistance and wet skid resistance, and the growing use of silica tyres. Reduced rolling resistance materials are examined with particular reference to solution polymerized butadiene rubber (S-SBR). The chief design factors for S-SBR are microstructure, molecular weight distribution and branching, and molecular modification by end-modification techniques. Silica tread compounds together with fuel efficient carbon blacks and other compounding materials are examined

For more information :
www.ingenta.com

On the ozone protection of polymers having non-conjugated unsaturation

Static ozone protection involving the use of paraffin wax and the dynamic ozone protection which involves the use of disubstituted p-phenylenediamines. The review is integrated with the experimental evaluation in a standard rubber compound of the most common substituted p-phenylenediamines (included a non-staining type).

For more information :
www.ingenta.com

■ INFORMATION TECHNOLOGY

The impact of information technology, innovation and entrepreneurship on economic performance is the subject of heated debate. Despite the current economic downturn, changes in these factors have brought about crucial, lasting changes to the growth dynamics of countries. That's why TWC expands its services to this field from this issue onwards in order to take a closer look at the ways in which these factors are evolving and how they relate to each other industries.

Improved Smart Card Technology for High Capacity Mobile Storage Applications

A Barmen company called Bayer AG has developed a suite of technologies aimed at combining the best of several worlds i.e. the ability to store and retrieve short-term alphanumeric data as well as store long-term image data, all in a secure, highly-mobile, personal package that enables only authorized persons to view files. Bayer accomplishes this by combining long-term optical data storage with short-term electronic storage, all on a convenient, credit card-type format. Short-term memory cards, typically known as Smart Cards, have been in use for some time in a wide variety of applications, including pre-paid phone cards and gift cards.

Bayer AG's high capacity memory card technology supports any number of applications in a range of industries, including medical documentation, shipping, remote test and measurement, insurance, corporate and military personnel records, and much more.

For more information:
www.yet2.com

Cellphones, Radars and Health



Exposure standards for electromagnetic radiation do not adequately address current realities

Today, we hold cellphones against our heads, walk past cellphone base stations in cities, cradle wireless personal digital assistants in our hands, and clip text-messaging devices and pagers to our belts.

We are even starting to connect our computers, cellphones, and peripherals with various wireless schemes. Yet amid this increasingly dense "electro-smog," we are still using the same outdated and inadequate standards to calculate our exposure to radio and microwaves.

Few of those studies, however, were designed to study low-level, localized biological effects not linked to heat. But electromagnetic theory and decades of experiments clearly indicate that the electromagnetic fields of radio and microwaves can also affect cells mechanically, without producing significant amounts of heat.

For more information:
www.spectrum.ieee.org/contents/

Encrypted Video Surveillance Technology Assures Privacy Rights

A company called KPN has developed a unique encrypted video surveillance system that ensures both the privacy of individuals and the ability of businesses and government agencies to prevent theft, damage, and mishap. The key component to the system is the BGR PrivaCam, a digital camera that takes recorded images and divides them into a series of discrete information streams. Using an encryption method called "secret sharing," these data streams are separated and sent to several different, authorized recipients.

The BGR PrivaCam system offers a number of advantages over competing technologies, including the in-camera encryption and storage, which eliminates remote storage and processing risks, as well as the possibility of unauthorized parties intercepting video image transmissions. In addition, in-camera processing avoids issues of security personnel misconduct and unnecessary procedures or protocols.

For more information:
www.yet2.com

Linking with Light

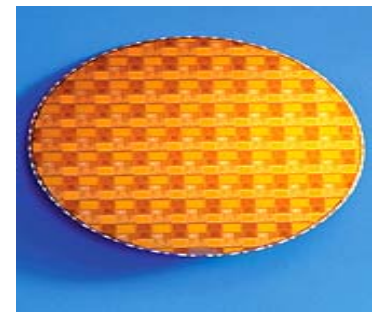
Having proven their worth in long-distance communications, photons will soon take over inside the computer

Within just a few years, many of the cop-

per connections in computers will yield to high-speed optical interconnects, in which photons, rather than electrons, will pass signals from board to board, or chip to chip, or even from one part of a chip to another. An electrical signal from the processor would modulate a miniature laser beam, which would shine through the air or a wave-guide to a photo detector, which would in turn pass the signal on to the electronics.

For more information:
www.yet2.com

Computing power will fade into the woodwork



Communication wafer: **Intel's "silicon radio" could help the world go wireless.**

Ubiquitous computing will be the dominant paradigm in information technology. Recognizing that the performance of Internet-distributed software might suffer due to network bottlenecks and lost data packets, Bang developed "intelligent routing" that maintains secure communications.

A way has been invented to keep wireless signals strong long after they've left a transmitter by broadcasting the same signal from multiple antennas. Such technology, combined with emerging standards for packing more data into radio transmissions, could extend bandwidth-hogging Web services to cell phones and handheld computers.

To be practical, such highly distributed systems will need the ability to diagnose and fix their own bugs and to reroute messages around lost nodes.

For more information:
<http://techreview.adbureau.net>

LOCAL R&D ACHIEVEMENTS

Industrial Technology Institute (ITI)

A new legume cereal drink

The technology for the preparation of a Legume/Cereal Drink based on Green gram, Soya and Rice has been developed by extrusion cooking at the Food Product Development Group of the Agro Food Technology Division. The technology has been developed on demand by the industry. Laboratory scale studies have been completed yielding a highly nutritious dry product with a protein content of 24.5 g. fat content of 5.8 g. per 100 g. of the product. The product gives a tasty, nutritious drink, when it is reconstituted with water or milk. After completion of the laboratory scale work, the ITI researchers have carried out a pilot scale study using the Instapro Extruder available at the industry. Large scale manufacturing is being carried out now by the industry.

ITIBULLETIN, Vol.10, No2

Technical Support to the Plastic Industry

ITI has recently acquired state-of-the-art equipment and it is now in a position to cater to the current testing and training needs of the plastics industry sector. Some of the equipment available at the ITI include an Accelerated (Ultra Violet) Weathering Chamber, a Torque Rheometer for carrying out processability tests, a Mini Extruder With Process Controls, a Lab Scale Blender (High Speed Mixer) for rigid and flexible PVC, a Gas Permeability Tester for packaging film, an Injection Moulding Machine, a Melt Flow Index Tester and an Universal Testing Machine of 5KN loading capacity. To complement these specific equipment, the Rubber and Plastics laboratory of the ITI is also equipped with an Infra Red Spectrometer and a Gas Chromatograph and has access to a Differential Thermal Analyzer / Thermo Gravimetric Analyzer and a Scanning Electron Microscope. The ITI facilities can also be used for identification, characterization, and reconstruction of plastics material as well as for analyzing product defects and service failures so as to identify the causes for the defects, in order that the problem could be

corrected at source.

ITIBULLETIN, Vol.10, No2

For more information:

Dr. Nirmala M. Pieris, Head, Corporate Services Division - Tel: 697994

Rubber Research Institute (RRI) A user friendly tapping machine

Latex from the rubber tree is extracted by a process called a tapping, where a thin slice of bark is removed with out wounding the cambium. This is a skilled job done only by experienced tappers using special type of knives made for this purpose. RRI has developed a tapping machine which can be handled by unskilled persons as well. Just by making few adjustments and setting, the machine can be used to achieve required depth and maintain the correct thickness of the bark shavings, so that any unskilled person can tap rubber trees correctly.

Re-usable polythene bags

The bags introduced by the RRI have a ridge at the edges of the polythene where sealing is necessary and instead of sealing, the ridged edge of the polythene is held together with the use of a piece of the plastic tube split and bent inwards length-wise to push through the polythene sheet. When transferring the plants the plastic tube at the bottom and on the side are pulled and removed so that the bag can be re-used. This method is applicable to any kind of polythene bag of any size.

For more information:

Mr. I.S.S. Pathiranta,
Rubber Research Institute

University of Peradeniya Dept. of Animal Science

One of the major problems in aquaculture is high cost of imported feed when it reached at the farm level. Dr. U.Edirisinghe at the Animal Science Dept., of Peradeniya University has developed a method to produce good quality feed at farm level from the raw materials that are available locally.

The ingredients and their composition

of the feed is given below:

Tilapia fish meal	35%
Shrimp head meal	23.5%
Soya flour	12.5%
Rice Bran	12%
Poonac	7.5%
Wheat flour	7%
Soya oil	0.5%
Cod-liver oil	1%
Vitamin/mineral mixture	1%
Yeast	0.5%

For more information :

Dr.U.Edirisinghe,

Dept. of Animal Science, University of Peradeniya. Tel : 08-387179

National Engineering Research & Development (NERD) Centre

Energy management for sustainable business

The following services are provided by the Energy and Environmental Management Centre to the industry.

- Carry out detailed energy audits in industries, commercial buildings, hotels etc. and generate an energy scenario, recommendations for energy conservation and action plan for implementation.
- System design in waste heat recovery, steam distribution and thermal energy applications
- Flue gas analysis and tuning up of burners in industrial combustion systems such as boilers and furnaces.
- Consultation to incorporate energy conservation measures at the planning

Testing facilities available for the Solar Photovoltaic and Electrical Lamp industry

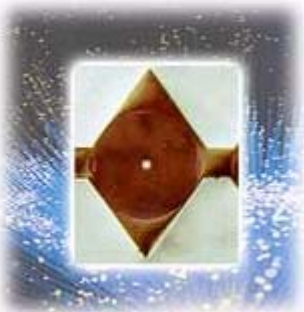
- Testing of Solar PV and Solar Home system
- Photometric measurements and electrical quality measurements of lamps
- Testing of PV panels and modules up to 35KW

For more information:

Eng.M.V.S.A.Kumara Perera
Techno Marketing Dept.
NERD Centre. Tel: 01-236284

POLYMER TECHNOLOGY

New coupling Technology



To overcome the major hurdle of volume manufacturing of polymer-waveguide devices and electro-optical components using polymer-wave guides for fiber connection, Bosch has pioneered a technology that resolves these issues simply and repeatably. By filling the alignment V-grooves on a micromachined silicon-substrate using plastic materials and subsequently coating the chip with an optically transparent polymer, the waveguides can be fabricated with the precision of standard photomask technology. In order to achieve a flat surface-cut of the fiber-to-waveguide interfaces, an excimer laser is used to remove the polymer filler from the trenches in a simple and cost-effective way, so that the fibers can be passively aligned with the necessary precision to the waveguide extending past the trench angle and, therefore, enabling a low-loss fiber-to-waveguide connection.

For more information:
www.yet2.com

FOOD TECHNOLOGY

Chemical-Free quality sugar.

A sugar mill and a national research institute have come together and successfully implemented a technique that helps in producing chemical-free, nil-sulphur, refined quality sugar.

The key ingredient in this technique, called ultra-filtration, are indigenous polymeric membrane modules. These membranes can withstand high temperatures and worldwide are only the second of their kind used in the sugar industry.

The sugarcane juice obtained from plantation crop is purified by these membrane modules, which act as filters. The advantages of this technique are improved recovery of sugar, good product quality, ten-fold improvement in juice clarity, almost 60% reduction in colour and the fact that no chemicals are used.

The process has been demonstrated on a 10 tph industrial-scale pilot plant and the technique has great potential to help sugar manufacturers.

ASIA-PACIFIC Tech Monitor,
Jul-Aug 2002

ENERGY FOR 21ST CENTURY

Green electricity from wood

Twenty-first century technology is about to bring back wood as a practical and renewable fuel for regional electricity generation. A research team from CSIRO has investigated the maximization of energy extraction from wood through the wood-gasification process. Gasification breaks down complex wood compounds into smaller volatile compounds. With controlled quantities of air, these can be burnt cleanly and efficiently in microturbines to create electricity with near zero emissions.

The microturbine technology has been developed by the Capstone Turbine Corporation of Los Angeles, a world leader in the field. This innovative, low-maintenance microturbines and sophisticated electronic controls make it possible to generate high quality electricity. These microturbines are already in commercial scale use all over the world with a variety of fuels including greenhouse waste gases from landfills and sewage plants.

For more information:
Asia Pacific Tech Monitor, Jan-Feb 2002

In Sri Lanka, electricity generation from wood has been successful in the recent past.

A power plant at Sapugaskanda area generates electricity at a power of 35KW using wood as the main input.

“STRIDE INTO THE FUTURE BEFORE IT ARRIVES”

TECHNOLOGY WATCH CENTER (TWC)

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- **Food Science & Bio Technology** - Ms. Ruvini Liyanage
- **Environmental Science & Technology**
- **Rubber & Polymer Science Technology** - Ms. Pradeesha Warnasooriya
- **Information Technology**

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