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**MAKLUMAT PERDAGANGAN
DAN PERNIAGAAN /
TRADE AND COMMERCIAL
INFORMATION**

**MATRADE TO INTENSIFY PROMOTION ON
MALAYSIAN PRODUCTS**

The Malaysia External Trade Development Corporation (MATRADE) is intensifying the promotion of Malaysian products and services in existing as well as in new and emerging markets, sources were quoted. MATRADE would be expanding the number and scope of its promotional activities which will be covering all regions with special emphasis given to China, West Asia and Asean this year.

MATRADE jointly with the Malaysian Industrial Development Authority (MIDA) would be organizing seven trade and investment missions. MATRADE would co-ordinate the participation of Malaysian companies in 73 international trade fairs, 11 in-store promotions, 36 international promotion booths and would organise seven specialised marketing missions. Malaysian manufactures and exporters are urged to participate actively in these programmes as they could avail themselves of a wide range of assistance and support from MATRADE and its network of 23 offices around the globe.

**TRACTORS MALAYSIA TO OPEN THREE MORE
CAT RENTAL STORES**

Tractors Malaysia Sdn. Bhd., which has opened its second "Cat Rental Store" in Johor Baharu, plans to open three more such stores in Bintulu, Kuantan and Butterworth by the year end to cater for the increasing demand for the rental of heavy equipment and machinery, sources were quoted.

These stores, a one-stop shop for rental equipment ranging from the larger Cat hydraulic excavators and backhoe loaders to the smaller skid steer loaders, forklifts and also power generators, have some 300 units of equipment valued at RM20 million out on rental.

SEMI BAYU BUYS MARDEC FOR RM40.53 MLN

The Ministry of Primary Industries has proceeded with the privatisation exercise of Mardec Bhd. by signing an agreement with a newly-formed consortium, Semi Bayu Sdn. Bhd. to takeover Mardec for RM40.53 million, sources were quoted.

The privatisation of Mardec is to move it in another direction as rubber production is no longer one of Malaysia's core industries.

KANDUNGAN / CONTENTS

MAKLUMAT PERDAGANGAN DAN PERNIAGAAN / TRADE AND COMMERCIAL INFORMATION	1
MAKLUMAT PENGELUARAN / PRODUCT INFORMATION	3
ULASAN BUKU / BOOK REVIEWS	4
MAKLUMAT PENYELIDIKAN DARI USM / RESEARCH INFORMATION FROM USM	7
PERKHIDMATAN KESEDARAN KINI / CURRENT AWARENESS SERVICE	12

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Semi Bayu, with an authorised capital of RM500 million, was formed by three parties namely Damai Akrib Sdn Bhd (55 percent), Meppco Sdn Bhd (30 percent) and Persatuan Kebangsaan Pekebun- Pekebun Kecil Getah (15 percent).

MALAYSIA READY TO PAY ITS SHARE IN RUBBER CONSORTIUM

Malaysia is ready to pay its share of the equity in an international tripartite consortium for rubber, sources were quoted. Indonesia would come up with cash or kind to increase their paid up capital to US\$1.5 million to fulfill the agreed-equity 4-3-2 -- four for Thailand, three for Indonesia and two for Malaysia.

According to an earlier agreement, Thailand agreed to pay US\$2 million, Indonesia US\$1.5 million and Malaysia US\$1 million. However, Indonesia said then it could only afford to pay US\$1 million.

Following another meeting in August 2002, the three countries had agreed that each contribute US\$1 million for an equity of 2-2-2, but later on Thailand disagreed and wanted the original equity (4-3-2) to stay.

Currently senior officers from the three countries were finalising the organisation's structure and its modus operandi.

SURVEY ON PRODUCTIVITY AND PERFORMANCE OF THE MANUFACTURING SECTOR, 1ST HALF OF 2002

The performance of the manufacturing sector recorded improvement in the 1st Half of 2002. The recovery was mainly driven by improvement in overall demand which positively impacted both the domestic and export-oriented industries, sources were quoted.

The labour market among the manufacturing sector remained stable. Better performance and higher orders received among the export and domestic-oriented industries, had initiated companies to increase the overtime hours.

The cost of imported material and component had increased primarily due to the increase in price of material. In terms of capital investment, many companies continued to utilise the existing capacity to meet the increase in demand. However, there are some companies in the sector, which had experienced an increase in capital investment.

The outlook for the manufacturing sector during the 2nd Half of 2002 is expected to remain favourable. With the improvement in sales and demand, capacity utilisation rate for the manufacturing sector is anticipated to improve. Sales and export market among the small and medium

industries (SMIs) and large-sized industries are also predicted to increase further.

TWENTY-TWO KOREAN SMIs RELOCATE TO PERAK

Twenty-two small and medium size industries (SMIs) from South Korea are expected to invest US\$33 million (RM125.4 million) to relocate their factories to Lumut, sources were quoted. The companies, mainly involved in manufacturing of components, are shifting here under a SMI relocation programme promoted and facilitated by Sungai Buloh-based Global Technology Industrial Park Sdn Bhd (GTIP).

Korean Overseas Direct Investment secretary general and chief executive officer of Sigma Investment Company, Park Chan Dong, said that the companies are moving out to reduce cost and take advantage of the Asean Free Trade Area (AFTA).

The companies are involved in the manufacturing of gypsum boards, technology development and plant engineering, steel production, factory automation system, computer and electrical system, conveyor system and water treatment and purification.

GTIP would continue to attract more SMIs from Korea to relocate here as well as from Japan and Taiwan.

HUMANOID TECHNOLOGY TO BE USED IN LOCAL MOTORING INDUSTRY

Honda's humanoid blended with intelligence, mobility and visual attractiveness robot called ASIMO (Advanced Step in Innovative Mobility) is expected to be absorbed into the manufacturing and motoring industry in Malaysia, sources were quoted.

Born on Oct 31 2000, ASIMO, at an affable 1.2 metres tall and weighing a diminutive 52kg, is made of a super futuristic light weight tough magnesium skin that houses some of the world's most technological advanced sensors and programming.

ASIMO's integrated power source allows him total independence and increased manoeuvrability whereby after two hours of charging, ASIMO can operate for 30 minutes depending on the movements.

Honda has produced 40 units of ASIMO and there were 20 companies in line in Japan which intended to obtain ASIMO.

MALAYSIAN PALM OIL OUTPUT TO GROW BY 2-3 PCT IN 2003

Malaysia's palm oil production is expected to grow by two to three percent in 2003 when compared with last year. The increased output can be attributed to the fact that a lot of plantation areas in Sabah with young palms would start producing palm oil in a bigger way this year, sources were quoted.

Malaysia's palm oil production for 2003 ought to have been lower as a result of the on-going replanting programme embarked from early last year following low prices for the commodity.

Malaysia has produced about 11.9 million tonnes of palm oil in 2002, a marginal increase from 11.8 million tonnes registered in 2001.

MAKLUMAT PENGELUARAN / PRODUCT INFORMATION

POLYMER COMPOSITE PROVIDES SURGE PROTECTION

Asea Brown Boveri (ABB) says it has developed an inexpensive polymer composite that can be used to provide electrical surge protection for low- and high-power applications. The material withstands higher currents and voltages than current devices and also has lower resistivity, making it useful for a range of voltage, current, and temperature requirements. The composite is made from a simple thermoplastic polymer, such as polypropylene, filled with an electrically conductive filler and a varistor - a material whose resistance decreases as current increases. The composite forms "hot spots" as the current increases, causing expansion and consequently a disruption in the circuit. As the material cools the circuit is reformed, and this process can be constantly repeated without any immediate loss of performance, sources were quoted.

One typical application is as a current limiting resistor. In this case, the polymer is filled with a conductive filler such as carbon black and a doped ceramic varistor based on a metal oxide, titanate, or carbide. The varistor, which has a breakdown voltage higher than the rated voltage of the electrical system being protected, is imbedded in the polymer body during the mould injecting process.

The difference in breakdown voltages between the polymeric resistance body and the varistor would enable a certain amount of current to continue flowing through the circuit even after it has been tripped. The technology works equally well in highly sensitive equipment such as computers and test and measurement instrumentation, to heavy-duty industrial controls and facility management systems.

GENECOR INTERNATIONAL; SMART POLYMERS PROVIDE LIGHT-ACTIVATED SWITCH TO TURN ENZYMES ON AND OFF

Researchers at the University of Washington have applied research in how proteins bind with different molecules to create a molecular switch that enables them to turn an enzyme on and off. The innovation holds promise for a wide range of laboratory processes, including highly targeted drug therapies, sources were quoted. The study, published in the December 16, 2002, online edition of Proceedings of the National Academy of Sciences USA, describes a reversible switch for the enzyme endoglucanase in which light is the trigger for turning the switch on and off.

ARCHOS INTRODUCES PORTABLE DVD WRITER

Archos has introduced the first portable (peripheral) DVD writer, the DEXDVD-RW. This innovative product offers the professional and home user the ability to create and store video films, images and all types of numerical files on any kind of DVD and CD. This recorder of DVD-RAM, DVD-R, DVD-RW is equipped with an ultra rapid USB 2.0 interface. It is also supplied with mastering software and hardware enabling the user to engrave, create and publish a new video DVD from scratch. Simply transfer numerical photographs from your computer system or directly from a digital video camera and create a DVD in a few minutes, sources were quoted.

GANO EXCEL LAUNCHES HEALTHCARE PRODUCTS

GANO Excel Enterprises Malaysia (GEEM) and Gano Excel India Pvt. Ltd. made a soft launch of products based on Ganoderma Lucidum, a wild mushroom which they claimed had maximum medicinal and therapeutic value and was grown mostly in China, Japan and Malaysia, sources were quoted. Ganoderma is an anti-oxidant organic substance marketed as a food item. GEEM has already introduced the products in 12 countries and among them are Malaysia, Australia, Indonesia, Philippines, Singapore, Thailand, Canada and the US. It is claimed that Ganoderma does not show side effects even after prolonged use. It improves the body constitution and its healing ability and ensures longer life. It could be used as a supplement to regular medicines by patients suffering from any disease and was believed to bring about a positive change in the quality of their life.

FOOD SUPPLEMENT TO HELP RAISE MILK YIELD IN CATTLE

Energreen Super SP 200 a Malaysian product - an improved version of rumen bypass fat - a purely vegetable based preparation from processed palm oil is proving to be highly successful with dairies. Rumen bypass fat is known to increase milk production and fat content in the lactating she-buffaloes. The product increases the dietary energy density, thus increasing the energy intake, sources were quoted.

The ROLE of agricultural taxation and anti-agriculture bias in economic growth. FAO Economic and Social Development Paper 150. Sarris, Alexander H. (HD1442.S247 2001)

While the role of agriculture in economic development seems to be well known and understood, there seems to be considerable difference of opinion concerning the role of taxation of agriculture, explicit or implicit and economic growth. The study first reviews the role of agricultural terms of trade in development and growth. The questions posed are whether or not the literature supports the view that at early stages of development agriculture should be taxed and if policies should contain an anti-agriculture bias. The study then reviews the ways in which anti-agriculture bias expresses itself in various countries.

CHEMISTRY of the environment. Spiro, Thomas G. & Stigliani, William M. 2nd ed. Upper Saddle River, New Jersey: Prentice Hall, 2003. (TD193.S759 2003)

Concise, comprehensive, readable and current, *Chemistry of the Environment*, Second Edition, gives up-to-date and user-friendly treatment of environmental chemistry. This book, designed for students who have taken or are taking general chemistry, explores and discusses topics such as energy flow through nature, the greenhouse effect, climate modeling, chemistry of the ozone layer, air pollution, redox potential and water pollution, toxic chemicals and acid rain. Featuring an unsurpassed marriage of chemical principles with issues of environmental concern, this book is unrivaled in terms of its ability to explain the chemistry behind the headlines.

WASTEWATER microbiology: nitrification and denitrification in the activated sludge process. Gerardi, Michael H. New York: J. Wiley & Sons, 2002. (TD758.5.N58G358 2002)

This book, the first in a series on the microbiology of wastewater treatment, comprises the critical topics of cost-effective operation, permit compliance, process control and troubleshooting in wastewater treatment plants. Avoiding the technical jargon, chemical equations and kinetics that typically accompany such texts, *Nitrification and Denitrification in the Activated Sludge Process* directly addresses plant operators and technicians, providing necessary information for understanding the microbiology and biological conditions that occur in the treatment process.

HAZARDOUS building materials: a guide to the selection of environmentally responsible alternatives. Curwell, Steve, Fox, Bob, Greenberg, Morris & March, Chris. 2nd ed. New York: Taylor & Francis Group, 2002. (fTA403.6.H428 2002)

Asbestos and lead are now known to have serious adverse effects on health, both at the individual and environmental level. New materials are constantly being developed; existing materials are being put to new uses. This new edition provides a detailed reference source of the use, in residential buildings, of materials known or suspected to harm health and the environment. Alternative materials are evaluated using unique data sheets which compare environmental impact, cost, health, safety and technical performance providing building and construction professionals and other practitioners with the facts they need to make informed decisions. The book considers the following building elements: structure, windows and doors, roofing, insulation, finishes and fittings, pipe services and services equipment. Based on the highly successful format of the first edition this practical reference provides expert advice with the use of clear drawings, tables and data sheets to architects, surveyors, construction managers, facilities managers, students of built environment courses, materials suppliers, environmentalists and clients. It is based on a project funded and encouraged by Godfrey Bradman out of concern for the effects of the built environment on peoples' health.

STRUCTURE and performance of cements. Bensted, J. & Barnes, P. (editors). 2nd ed. New York: Taylor & Francis Group, 2002. (TA434.S927 2002)

Cements constitute the second largest manufactured commodity (by weight) in the world and have a greater number and range of applications today than ever before. Drawing together a multinational team of authors, this second edition of *Structure and Performance of Cements* highlights the latest global advances in the field of cement technology. Three broad categories are covered: basic materials and methods, cement extenders and techniques of examination. Within these categories consideration has been given to environmental issues such as the use of waste materials in cement-burning as supplementary fuels, recent developments for encapsulating toxic and radioactive waste and new and improved methods of instrumentation for examining structural aspects and performance of cements. This book also covers cement production, mineralogy and hydration, as well as the mechanical properties of cement and the corrosion and durability of cementitious systems. Special cements are included, along with calcium aluminate and blended cements, together with a consideration of the role of gypsum in cements.

PETROLOGY: the study of igneous sedimentary and metamorphic rocks. Raymond, Loren A. 2nd ed. New York: McGraw-Hill, 2002. (fQE431.2.R269 2002)

Petrology incorporates both fundamentals and information on recent advances in the understanding of igneous, sedimentary and metamorphic rocks.

Features of this book include:

- ◆ Major enhancements of the chapters on origin, movement and modification of magmas and granitoid rocks.
- ◆ An entirely new section on ultrahigh pressure (UHP) metamorphism is included in the chapter on eclogites.
- ◆ The epilogue places all rock types into appropriate petroctonic assemblages representing various plate tectonic sites.
- ◆ New ideas on genesis of Cascade range andesites and basalts are included.

TOUCH in virtual environments: haptics and the design of interactive systems. McLaughlin, Margaret L., Hespanha, Joao P. & Sukhatme, Gaurav S. New Jersey: Prentice Hall, 2002. (QA76.9.H85T722 2002)

Haptics, the science of virtual touch, is the latest frontier in VR interface development. Modeling tactile features such as shape, texture and density, haptics offers extensive applications for training simulators, entertainment and gaming, museum displays and assistive technologies for the disabled. In this book, experts from the fields of communication, computer science and engineering bring together the most current research in this rapidly emerging field. Topics include:

- ◆ Controlling the haptic interface: modeling, control, measurement, visualization and rendering.
- ◆ Managing haptic data: libraries, compression and Internet applications.
- ◆ Human factors: detection thresholds, probe design and systems for display and feedback.
- ◆ Implementation: case studies and future plans.

HANDBOOK of applied surface and colloid chemistry. Holmberg, Krister (editor). Vol.1 & 2. London: J. Wiley & Sons Ltd., 2002. (TP149.H236 2002)

This handbook is a reference work in the important field of applied surface and colloid chemistry. Unique in scope and including an enormous wealth of mainly practically oriented information it treats the topic in a thorough and comprehensive manner. The *Handbook of Applied Surface and Colloid Chemistry* will demonstrate the wide range of fields in which the fundamental science has been applied. It is practically organized into five sections:

- ◆ Surface chemistry in important technologies

- ◆ Surfactants
- ◆ Colloid systems and layer structures at surfaces
- ◆ Phenomena in surface chemistry
- ◆ Analysis and characterization in surface chemistry

INTERACTIONS between soil particles and microorganisms and the impact on the terrestrial ecosystem. Huang, P.M., Bollag, J.M. & Senesi, N. New York: J. Wiley & Sons, 2002. (S592.53.I61 2002)

The three major (solid) components of soil – minerals, organic components and microorganisms – together profoundly affect the physicochemical and biological properties of terrestrial systems. To date, there have been major scientific accomplishments in individual sub-disciplines, i.e., in the chemistry of soil minerals, the chemistry of soil organic matter and soil microbiology. However, minerals, organic matter and microorganisms should not be considered as separate entities but rather as a united system, with the components constantly in close association and interaction with each other in the terrestrial environment. These interactions have an enormous impact on terrestrial processes critical to environment quality and ecosystem health around the globe.

TECHNOLOGY management : text and international cases. Harrison, Norma & Samson, Danny. Boston : McGraw-Hill, 2002. (T49.5.H321 2002)

This is a text and case approach to studying the many facets of technology management. A broad and diverse perspective is presented from various industries throughout the world. This approach provides readers better understanding of key success factors for implementation of technology projects. Readers see first-hand how to implement technological change by examining the processes, routines, organizational structure, cultural and leadership factors that relate to introducing and implementing successful new technology. The most exciting and beneficial aspect of this text is its authorship, the cases were written by leading experts from top institutions around the world including USA, UK, Germany, Japan, Korea, Australia and Canada.

ESSENTIALS of capacity management. Reginald Tomas Yu-Lee. New York: J. Wiley & Sons, 2002. (HD69.C3Y94 2002)

Proper capacity management is the driving force behind outstanding corporate performance. *Essentials of Capacity Management* describes its impact on operations, as well as how to use measurement systems and process analysis to enhance capacity usage. This is a solid foundation in capacity management for the business professional. Managers and executives will better understand that managing the effectiveness and efficiency of processes reduces the amount of capacity required, thus providing an opportunity to reduce costs while improving process quality and reducing process time.

INTERNATIONAL business: a managerial perspective. Griffin, Ricky W. & Pustav, Michael W. 3rd ed. Upper Saddle River: Prentice Hall, 2002. (HD62.4.G852 2002 f)

In the third edition of this popular text, the authors illustrate how successful managers must understand global issues and adapt to change in order to succeed in a competitive international marketplace. This edition is updated with current issues and events, and includes a wealth of new content features aimed to help future managers interpret business information with a global perspective. This book addresses all the functional areas of business and how managers work in a global marketplace, addresses how business activities are increasingly driven by technology, coverage of technological issues and events, and with 40 brief cases, 8 comprehensive cases, 42 maps, and hundreds of real world examples. Also includes numerous features that help readers understand the rapidly changing world of international business and the accompanying FT.com website gives students an archive of the Financial Times and 3,000 other publications.

COMMERCIAL bank management. Rose, Peter S. 5th ed. Boston: McGraw-Hill, 2002. (HG1615.R797 2002)

Like previous editions, the 5th ed. is designed to help those readers who are thinking about a career in banking and in the banking field, by providing them with a view of the subject from the perspective of both a bank customer and bank manager. This is a classic text on commercial banking in the United States. It walks readers through all aspects of banking: financial statements, ALM, derivatives, the investment function, liquidity and reserve management, deposits, lending, branches, mergers and acquisitions, and much more. This book is good as a comprehensive overview for people new to the industry or as a practical reference for anyone with banking experience.

MANAGING for world class safety. Stewart, J. M. New York: J. Wiley, 2002. (HD7262.S849 2002)

This book describes the model of safety management that underpins the questionnaire and then demonstrates how this innovative procedure illuminates critical intangibles like management commitment, the enforcement of rules, worker involvement, and injury investigation. The central part of this book is the description of research at the University of Toronto that applies the questionnaire in comprehensive research at five of the world's safest companies and five with very poor safety. The questionnaire polled 700 people in the ten companies, "measuring" the level of more than twenty key elements such as:

- The workers' perception of the priority given to safety
- The belief that all injuries can be prevented
- The extent to which line management takes responsibility /accountability for safety
- How well safety rules are followed and enforced
- The frequency and quality of safety meetings
- The level of recognition to reinforce safety excellence
- In every element, the contrast between the responses from the very safe companies and those from the companies with poor safety was dramatic, clearly depicting where the former succeed and the latter fail.

By developing quantitative benchmark data, the author reasons that it will be easier to convince reluctant management to undertake the fundamental change necessary for a "step change" in their company performance. *Managing for World Class Safety* promises a revolutionary new approach to workplace safety improvement for corporate leaders, safety professionals, and regulators.

ADVANCED brand management: from vision to valuation. Temporal, Paul. Singapore: J. Wiley & Sons (Asia) Pte. Ltd., 2002. (HD69.B7T289 2002)

Product branding is often a high-stakes gamble-even when there's substantial market research behind it. The Classic Coke fiasco is just one example. With millions of dollars at stake each time out, companies can't afford branding strategies that can't stand up in the marketplace. This book presents more than 25 case studies and the highly sophisticated branding techniques used by some of the world's leading companies such as Intel, Mazda, Virgin, Hang Seng Bank and Philips. Strategies such as brand stretching and brand architecture are described, especially as tools for managing the total brand experience and value. The book also includes a brand management toolkit, which provides checklists and exercises, as well as global and Asian case studies. This indispensable practitioner's guide will help companies secure lasting brand equity for their products. Whether you are in control of an established company, starting up a new one or managing brands in any industry or sector, this book is good reading.

The STARTUP garden : how growing a business grows you. Ehrenfeld, Tom. New York: McGraw-Hill, 2002. (HB615.E33 2002)

This book will help you take an honest look at yourself to determine who you are, what you care about, and what you are good at --before you engage in the nuts-and-bolts tasks of starting your business and controlling your own destiny. From there, each chapter focuses on a particular skill you will need to operate your enterprise, providing a step-by-step examination of the business, financial, managerial, and marketing skills required to make your dream business a reality. Dozens of interviews with now-successful entrepreneurs, along with case studies and examples, show you how others have set their businesses up--from financial reporting necessities to tips on handling employees to techniques for expansion--and illustrate how to handle the inevitable difficulties along the way. Filled with worksheets and practical advice from those who came before you, and have made their way down the same path you're now considering, this no-nonsense guidebook discusses: how to determine what truly matters to you and what you are good at, then combine the two into a career; where to find the money to fuel your new business, from personal assets to investors to business loans; 10 Classic Bootstrapping Tips--From using college interns to haggling, proven ways to stretch your limited cash; and when you start an enterprise, you are the enterprise. As the enterprise grows and develops, so will you. Wherever you are in the process of launching a business, from the initial idea to the eventual need for growth and diversification, The Startup Garden will help you to ensure that your new business has the proper foundation for survival, success and growth--by first helping you ensure that the business is right for you.

APPLIED management science : modeling, spreadsheet analysis, and communication for decision making.

Lawrence, John A. and Pasternack, Barry A. 2nd ed. New York: J. Wiley & Sons, 2002. (HD30.25.L422 2002 f)

This book shows readers how to use the management science results in actual managerial decision making. It focuses on real-world applications and using software rather than straight mathematics. This approach allows readers to concentrate on learning to use the management science results in managerial decision making.

**MAKLUMAT PENYELIDIKAN
DARI USM / RESEARCH INFORMATION
FROM USM**

**RELAY FEEDBACK AUTO-TUNING
CONTROLLER FOR WASTE WATER
TREATMENT**

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ABSTRACT

The control of wastewater operating parameters, especially pH has long been regarded as a difficult task. This difficulty arises from its severe process non-linearity, tremendous dead time and frequent load changes, such as changes in the influent composition and flow rate. The non-linearity can be seen from the S-shaped static pH responses with the addition of titrant where the process gain is low in the buffered zone and extremely high around the neutrality point. In order to make the pH control effective, for example, we need a controller which is rapid in the buffered zone with large controller gain and sensitive around neutrality (pH 6-8 where that is a sudden change from acid to base condition). The controller gain in this region must be small enough in order to maintain a constant gain in the feedback loop to avoid sustained oscillation around the set-point. This difficulty has led to the various alternatives being introduced to solve the problems, such as predictive combined with traditional control, modified PI controller, adaptive control. Predictive-adaptive control, fuzzy logic and gain scheduling. In this study, a relay feedback auto-tuning controller is used to regulate the pH. The auto-tuner will excite the process output into limit cycles--from where the ultimate gain and period can be determined. The PID values can be calculated based on these parameters and imparted to the controller.

SOLAR MOBILE EXHIBITION UNIT

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ABSTRACT

CETREE's Mobile Exhibition Unit aims to increase awareness about Energy Efficiency and Renewable Energy. This is carried out through its cargo of information materials, teaching aids and demonstration technologies all in the solar mobile van which displays products from the Solar Photovoltaic System (Solar refrigerator, oven, coffee maker, clean room and pest trap), Passive Solar System (Solar water heater, dryer and cooker) and Energy Efficient Unit which display the solar lamp.

A SAFE AND ECONOMICALLY FEASIBLE METHOD OF TURNING COCONUT TREE WASTE INTO AN ADDITIVE FOR DRILLING MUD

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ABSTRACT

Malaysia is one of the countries that play an important role in exporting coconuts and coconut products. At the coconut farm, fruit bunch and frond are not more than just waste materials. Therefore this work is devoted to recycle these waste materials by developing an economically feasible method of obtaining lignin from them. The lignin is useful for a number of applications especially because of their adhesion and dispersion properties. One of the most important applications of lignin in oil and gas industries is as a basic material in producing a drilling mud thinner, which is lignosulfonate. In this study, a method of isolation of lignin introduced by Klason is presented. This method used 70 % sulfuric acid and the lignin obtained is brown in colour, which is darker compared to other techniques that involve acid in the isolation process. The Klason sulfuric acid method was chosen due to its simplicity and did not involve using toxic materials as well as dangerous chemical reactions. The characterization of the lignin using an Infra-Red (IR), X-ray diffraction and ash contain techniques were also presented. Based on the study, the percentage yields of lignin that came from the fruit bunch was 19 % whereas the frond contributed up to 25 %. Therefore, the frond of coconut trees has a better potential for commercialization purposes.

POTENTIAL OF LOCAL POULTRY OFFAL MEAL AS CHEAPER DIETARY PROTEIN FOR FRESH-WATER FISH FARMING IN MALAYSIA

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ABSTRACT

Poultry by product meal is found in abundance in Malaysia due to the large volume of chicken meat. Such kind of meal usually contains feather, intestines, head, and feet together with bones, depending on processing location and method. Due to the increasing cost and decreasing supply of fish meal, we have identified the potential of this material as protein source for fish feed. Several research projects are currently being undertaken at Universiti Sains Malaysia to further understand and improve the usage of locally produced poultry offal meal as a reliable and acceptable feed ingredient. This present paper reports on some preliminary results of completed and ongoing feeding involving standard fish meal replacement evaluation. The species tested are two-food species tilapia and river catfish

(*Mystus nemurus*) and a popular ornamental species, discus fish (*Symphysodon* spp.). Results from growth parameters feed conversion and also digestibility coefficients indicated that different species utilized meal differently with tilapia showing highest efficiency in using higher replacement levels as compared to other species. There was no significant reduction in specific growth rate values of tilapia until the 50% replacement level diet. Studies also pointed to factors such as imbalanced amino acid profile, inavailability of essential amino acids such as methionine and lysine as important hindrances for large-scale use in aquaculture. Furthermore, in species like catfish and discus, palatability remains an issue to be addressed since these species have reputation of being selective feeders. This paper also will discuss further on various methods to further improve utilization of this feed for development of freshwater aquaculture feed in this region.

Anugerah Ekspo Sains dan Teknologi 2002
Science & Technology Expo Awards
Source: PRO, USM

MOBILE PLANKTON PRODUCTION KIT FOR THE AQUACULTURE INDUSTRY

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ABSTRACT

The mobile plankton production kit produces high quality plankton algae for the aquaculture industry at minimal skill, material and budgetary costs. It is an extremely simple kit that enables the layman to set up almost anywhere, even in the remotest culture locations.

The algae produced which is the necessary food for young cultured animals have been screened and selected from local marine flora. Only the optimized levels of nutrients are supplied to the cultured plankton so that none is wasted. Both this parameters reflect on the environmentally friendly nature of the invention.

Here the traditionally complex system which uses expensive and complicated equipment such as UV sterilizers, autoclaves and complicated chemical concoctions are done away with – to be replaced by a ready-made kit – the first of its kind in the world (patent pending).

BIODEGRADABLE POUCH

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ABSTRACT

The pouch is made from heavily cross-linked soy protein films using natural chemical reactions that are known to occur during food processing. The films are completely biodegradable within 1-3 months depending upon the extent of cross-linked to release e.g fertilizers or water gels or other compounds that are intend for controlled-release purposes. It is also possible to control the release of content of the pouch by using multi-layers of films or multi-pouches.

Target Industries: Fertilizer industries; packing industries; plantation industries

FROM BLACK LIQUOR TO DRILLING MUD THINNER

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ABSTRACT

This innovation presents an elegant approach of turning oil palm lignocellulosic water (black liquor) into a valuable material, a drilling mud thinner. Large volumes of black liquor (Waste form prepared soda pulping). This means not only lignin is lost but also rivers and lakes are contaminated. There is a need to recycle this waste material into more valuable product such as lignin. The major contribution of lignin towards the oil and gas industries is a basic material in producing a drilling mud thinner, which is lignin solfanates or better knows as lignosulfonates. Lignosulfonates are very versatile and utilized in mud to act as a deflocculants agent.

The lignosulfonate molecules adsorb on the clay surface (bentonite) and prevent the plates from linking. Besides, lignosulfonates are valuable for stabilizing oil-in-water emulsions which give the drilling mud improved properties in control of water loss, reduction of torque on the drill stem, increase of bit life and general improvement of bore-hole conditions.

The oil palm waste used in this process was black liquor obtained from empty fruit bunch (EFB). The lignin was isolated by acidifying the hot black liquor until pH 2 before filters the sample. The solid fraction was the recovered lignin. Lignosulfonated can easily be formed from the produced lignin by mixing with sodium and water 70°C for seven hours. Some rheological performance of this product will presented.

DECROSSPRO: A NOVEL MECHANO-CHEMICAL PROCESS FOR RECYCLING RUBBER WASTES

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ABSTRACT

Main purpose of Invention:

- ◆ To recycle all rubber wastes such as tyres, scrap gloves, hose, etc.
- ◆ Help Malaysian government to solve the environmental problem of disposal various rubber wastes through the recycling of scraps.
- ◆ To use the cheapest process to recycle rubber wastes and to produce a new product using a recycle rubber.

Major advantages of the Invention:

- ◆ With the help of mechanical shearing (Rubber processing equipments such as internal mixer, roll mill, etc) all rubber wastes can be recycled using DeCross CHEM.
- ◆ A recycle rubber called DeCross Compound can be converted into new product either using 100% DeCross Compound (recycle rubber compound) or blend it with new rubber in the presence of curative agents.
- ◆ A moderate strength of new products (about 5-7 Mpa) is obtained using 100% recycle rubber compound and very good products (about 18-20 Mpa) is obtained by blending 50% of recycle rubber and 50% of new rubber.
- ◆ Only 5 gram of DeCrossCHEM is needed to recycle 100 gm rubber wastes.
- ◆ The manufacturing cost for DeCrossCHEM is only RM15/kg.

HONEYCOMB STRUCTURE FOR ROOFING AND PANELS APPLICATION

Dr. Luay Bakir Hussain and Prof. Madya Hanafi Ismail

ABSTRACT

Light metals as sandwich honeycomb using recycled materials such as rubber and aluminum as filler materials can be used as roofing materials and panels. The structures are strong, light and thermally comfortable (low air conditioning may be needed) in comparison with ceramic bricks and other types of panels and also sound proof. No cracks easy to exchange and replace in comparison to ceramics bricks and concrete. Over all weight of metal roofing does not need concrete piles as columns. Light metal roofing can be fitted with lightweight trusses and reduce the primary concerns with timber (good quality insect attacks and also the increased environmental pressure on governments not to cut down any more trees).

LOW COST METAL CUTTING WHEEL

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ABSTRACT

Cheap cutting wheel such as reused copper grate steel, carbon steel implantation a layer containing hard species suitable for cutting hard material can be produced.

CLEANCAT1

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ABSTRACT

Cleancat1 is a specially formulated photocatalyst for visible light wastewater treatment. Any substances that can enhance the reaction of chemicals may it be organic or metal ions by light is termed photocatalyst. Cleancat1 is a composite photocatalyst immobilized on metal or plastic surfaces via a simple and fast method development in our laboratory. Light that impinges on the surface of the catalyst produces highly oxidative holes and electrons. Any organics exposed to these holes shall be oxidized to CO_2 and H_2O . Metal ions on the other hand will be reduced to their respective metallic forms.

The rates and applicability of this reaction will be defined by the catalyst chosen. Since this is an immobilized catalyst, no filtration unit is needed for separation. The catalyst activities are sustainable. The technology solves the problem of wastewater treatment without complicated set-up, chemical additives and fear of sludge production.

Product features :-

- ◆ A fast, efficient and cheap immobilization technique of catalyst
- ◆ Photocatalyst that can be immobilized on solid support such as metal and plastic or directly on reactor surfaces
- ◆ Photocatalyst that operates under UV and visible illumination (even household 8 watt fluorescent lamps)
- ◆ Photocatalytic efficiency equivalent to suspension mode
- ◆ Can be repeatedly used without degeneration (Sustained)
- ◆ Textile wastewater treatment without sludges and chemical additive that only requires household fluorescent lamps!
- ◆ A truly environmental friendly technology
- ◆ Working with various photoreactor designs - Just turn-on the light!

TYPHIRAPID: A RAPID 15 MINUTE IgM TEST FOR THE ACUTE DIAGNOSIS OF TYPHOID FEVER

Prof. Asma Ismail, Dr. M. Ravichandran, Puan Aziah Ismail and Foong Sui Yun

ABSTRACT

Diagnostic kit for rapid 15 minute detection of typhoid disease.

ECO-FRIENDLY AGRO-FIBRES BASED REINFORCED THERMOSET COMPOSITE MOULDINGS

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ABSTRACT

The products using agro-wastes as fibre reinforced to fully replace well established glass fibres (FRP manufacturer) in unsaturated polyester well composites. Owing to its unique properties of agro-fibres, developed various products composites such as for civil engineering materials, roofing, furniture parts, boat hulls, automotive industry, water tanks and bathtubs.

Potential Customers:

- ◆ The primary direct beneficiaries would be the technology community and related industries an alternative material using locally available wastes fibre resources.
- ◆ Local agricultural sector- as we approach next millennium, environmental concern of disposal of agricultural wastes.
- ◆ Local glass fibre reinforced composites (FRP) manufacturer-alternative supply/use of agricultural wastes fibre to currently imported materials.
- ◆ Local wood panel industry – alternative supply/use of wood panel industry.

National Impacts

- ◆ Increase the utilization of local resources based raw materials to produce value added products, which are made from renewable resources.
- ◆ Reduce import of glass fibre composites.
- ◆ Reduce the environmental and health hazards associated with the disposal of agricultural wastes such as oil palm fibres, pineapple leaf fibres, banana fibres etc.

ENVIRONMENTAL FRIENDLY PILOT PLANT PROCESS FOR UPGRADING LOW RANK COAL TO HIGH RANK COAL TO BE USED AS ANOTHER ALTERNATIVE USEFUL FUEL IN MALAYSIA

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ABSTRACT

The JRRR pilot Chamber is a compact system to act as demister, cooler condenser, expansion chamber, gravity settler, separator, retarder, trapper, filter, absorber and or adsorber. This is to make the upgrading process of the low rank coal environmentally friendly. It consists of one large cylindrical chamber with spiral jacketed cooling system, fitted at the bottom with a conical separator to collect the solid particles and the organic liquid chemicals. The chamber is subdivided by three different partitions for retarding, trapping and filtering particles. The upper partition is packed with special packing, used for absorption and or adsorption of any flue gases such as SO₂. This chamber operates efficiently to process the outflow (flue gases, solid particles and organic liquid chemicals vapour) from JMK Pilot kiln to be environmentally friendly.

A NOVEL PROCESS BASED ON MEMBRANE TECHNOLOGY FOR TREATMENT OF PALM OIL MILL EFFLUENT (POME)

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ABSTRACT

The main purpose of this invention is to introduce a new, effective and innovative treatment process for POME based on Membrane technology. Membrane technology has been recognized as an efficient, economic and reliable separation process. Low operating costs and the ability to remove organic contaminants make it an attractive technology for many industrial applications.

Major advantages of the invention:

- ◆ To introduce a clean and efficient novel treatment system based on latest Membrane Separation Technology to treat Palm Oil Mill Effluent (POME)
- ◆ To ensure compliance to regulatory discharge standard as gazetted in Environmental Quality Act 1978.
- ◆ To promote 85% recovery/recycling of water from the introduced treatment system.
- ◆ To prevent environmental pollution especially in the area of water pollution.

PRODUCTION OF HYDROGEN AND ETHANOL FROM SYNTHESIS GAS AS FUTURE FUEL USING BIOCATALYSTS

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ABSTRACT

Objective:

- ◆ To find an alternative new process to produce fuels and chemicals using renewable sources such as biomass and agrowaste.
- ◆ To create a process working at ambient pressure and temperature to minimize energy and cost compared to the other catalytic processes.
- ◆ Hydrogen and ethanol from these reactions can be utilized as a clean fuel for industrial and other technological purpose.

INTELLIGENT NETWORK MONITORING SYSTEM

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ABSTRACT

iNetmon is a software application that can run on any Windows 98, 2000, NT or XP PC connected to the computer network. It will automatically perform data collection of data that flows on a LAN segment, analyzes the data that is decoded, provide statistical calculations and display the analyzed data. Multiple data-collection components called iAgents that collect information from separate switches or network segments will allow iNetmon to monitor multiple segments and switches from a single workstation. It is an intelligent tool to assist network and system administrators by anticipating and giving intelligent information for preventive measures to be taken so that damage as a result of system or network down time that can be very costly minimized. Real-time network analysis, helps detect and resolve network faults and performance problems quickly. It even has the power to analyze multi-topology, multi-protocol networks automatically.

PORTABLE FOAM GENERATOR FOR THE PRODUCTION OF LIGHT-WEIGHT FOAM CONCRETE

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ABSTRACT

The main purpose of the Portafoam is to produce preformed stable aqueous foam, which is one of the ingredients used in the production of lightweight foamed concrete.

**PERKHIDMATAN KESEDARAN KINI /
CURRENT AWARENESS SERVICE**

AGRICULTURE

- 1) ROLE of research and regulation in 50 years of pest management in agriculture. Wheeler, Willis B. *Journal of agricultural and food chemistry*. 2002: 50(15), 4151-4155.

AGROINDUSTRY

- 2) TROTTER towers: what happens when you let an engineer and an architect design the farm of the future? Kittl, Beate. *New scientist*. 2002: 174(2346), 42-43.

AQUACULTURE

- 3) ADDING value to live, commercial size soft-shell clams (*mya arenaria* L.) in Maine, USA: results from repeated, small-scale, field impoundment trails. Beal, Brian F. *Aquaculture*. 2002: 210(1-4), 119-135.
- 4) APPLICATION of mixed-model techniques to fish breed improvement: analysis of breeding-value selection to increase 98-day body weight in tilapia. Gall, Graham A.E. and Yosni Bakar. *Aquaculture*. 2002: 212(1-4), 93-113.
- 5) DEVELOPMENT of a positive – negative selection procedure for gene targeting in fish cells. Chen, Songlin, *et al.* *Aquaculture*. 2002: 214(1-4), 67-79.
- 6) EFFECT of hydrogen ion on macrobrachium rosenbergii (de Man) egg hatchability in brackish water. Law, A.T., *et al.* *Aquaculture*. 2002: 214(1-4), 247-251.
- 7) EFFECTIVE use of plastic sheet as substrate in enhancing tropical oyster (*crassostrea iredalei* faustino) larvae settlement in the hatchery. Devakie, M.N. and Ali, A.B. *Aquaculture*. 2002: 212(1-4), 277-287.
- 8) FARMING triploid oysters. Nell, John A. *Aquaculture*. 2002: 210(1-4), 69-88.
- 9) INTERACTIONS between myxobacteria, plant pathogenic fungi, and biocontrol agents. Bull, C.T., *et al.* *Plant disease*. 2002: 86(8), 889-896.
- 10) LEVEL and percentage recovery of resistance to oxytetracycline and oxolinic acid of bacteria from shrimp ponds. Tendencia, Eleonor A. and dela Pena, Leobert D. *Aquaculture*. 2002: 213(1-4), 1-13.
- 11) NUTRIENT removal from aquaculture wastewater using a constructed wetlands system. Lin, Ying-Feng, *et al.* *Aquaculture*. 2002: 209(1-4), 169-184.
- 12) RECYCLING pond mud nutrients in integrated lotus-fish culture. Yang Yi, C. Kwei Lin and Diana, James S. *Aquaculture*. 2002: 212 (1-4), 213-226.
- 13) STUDY of a suitable fish plasma for in vitro culture of glochidia *hyriopsis myersiana*. Uthaiwan, Kovitvadhi, *et al.* *Aquaculture*. 2002: 209(1-4), 197-208.
- 14) A SUCCESSFUL microbound diet for the larval culture of freshwater prawn macrobrachium rosenbergii. Kovalenko, Ekaterina E., *et al.* *Aquaculture*. 2002: 210(1-4), 385-395.
- 15) VITAMIN E sparing effect by dietary vitamin C in juvenile hybrid tilapia, *oreochromis niloticus* x *O. aureus*. Shiau, Shi-Yen and Hsu, Chun-Yi. *Aquaculture*. 2002: 210(1-4), 335-342.

AUTOMATION

- 16) TROTTER towers: what happens when you let an engineer and an architect design the farm of the future? Kittl, Beate. *New scientist*. 2002: 174(2346), 42-43.
- 17) EPS bead molders turn to automation. Schut, Jan H. *Plastics technology*. 2002: 48(6), 56-57, 59-61.

BANK AND BANKING

- 18) The CHALLENGES of Islamic banking in Iran. Sadegh Bakhtiari. *The Asian economic review*. 2002: 44(1), 47-57.
- 19) INVESTMENT management in banks: key issues. Mittal, R.K. and Ashok, Kumar. *The Asian economic review*. 2002: 44(2), 269-276.

BEVERAGES

- 20) IT's tea time. Hollingsworth, Pierce. *Food technology*. 2002: 56(7), 16.
- 21) RAPID determination of caffeine content in soft drinks using FTIR-ATR spectroscopy. Paradkar, Manish M. and Irudayaraj, Joseph. *Food chemistry*. 2002: 78(2), 261-266.

BIOTECHNOLOGY

- 22) BEES on patrol: studies find bees are potential chemical, biological agent detectors. Ember, Lois. *Chemical and engineering news*. 2002: 80(20), 9.

CHEMICALS AND CHEMISTRY

- 23) CHEMICAL strategies to design textured materials: from microporous and mesoporous oxides to nanonetworks and hierarchical structures. Soler-Illia, Galo J. de A.A., *et al.* *Chemical reviews*. 2002: 102(11), 4093-4138.
- 24) The CHINA factor: among small U.S. companies, establishing a China connection has great appeal. Rouhi, A. Maureen. *Chemical and engineering news*. 2002: 80(29), 67-68.
- 25) FINE chemicals: midway through 2002, producers are cautiously going about business, adopting different strategies to achieve growth. Rouhi, A. Maureen. *Chemical and engineering news*. 2002: 80(29), 45-46, 48, 50-52, 54, 56-57, 59, 61-62.
- 26) KINETICS of cross-polarization in solid-state NMR: a guide for chemists. Kolodziejski, Wacław and Klinowski, Jacek. *Chemical reviews*. 2002: 102(3), 613-628.
- 27) MASS spectrometry of free radicals. Sablier, Michel and Fuji, Toshihiro. *Chemical review*. 2002: 102(9), 2855-2924.
- 28) ORGANIC solid traps gases. Zurer, Pamela S. *Chemical and engineering news*. 2002: 80(27), 27.
- 29) PHOTOINDUCED linkage isomers of transition-metal nitrosyl compounds and related complexes. Coppens, Philip, *et al.* *Chemical reviews*. 2002: 102(4), 861-883.
- 30) RECOVERABLE catalysts and reagents using recyclable polystyrene-based supports. McNamara, Catherine A., *et al.* *Chemical reviews*. 2002: 102(10), 3275-3300.
- 31) STEREOSELECTIVE organic reactions in water. Lindstrom, Ulf M. *Chemical reviews*. 2002: 102(8), 2751-2772.
- 32) The THERMODYNAMIC properties of phosphorus and solid binary phosphides. Schlesinger, Mark E. *Chemical Reviews*. 2002: 102(11), 4267-4301.

COMPUTERS AND ELECTRONICS

- 33) BEYOND point-and-shoot. Cardinal, David. *PC magazine*. 2002: 21(14), 72-75.
- 34) BIOLOGICAL apocalypse. Ember, Lois R. *Chemical and engineering news*. 2002: 80(9), 50-51.
- 35) CELLULAR future: creative chemistry, biology, plus powerful instruments and computers propel Pacific Northwest National Laboratory into proteomics era. Johnson, Jeff. *Chemical and engineering news*. 2002: 80(20), 32-36.
- 36) ELECTRONIC chemicals: now going through difficult times, the electronic materials industry should soon return to prosperity as the economy improves. Tremblay, Jean-Francois. *Chemical and engineering news*. 2002: 80(28), 19-22.
- 37) PITTCON 2002: itsy-bitsy mass spectrometers. Henry, Celia M. *Chemical and engineering news*. 2002: 80(914), 34-35.
- 38) POWER to the portable: today's notebooks are packing quite a punch. Behr, Mary E. *PC magazine*. 2002: 21(12), 98-110, 113, 115.
- 39) REMOTE control: don't feel tied to the office. Metz, Cade. *PC magazine*. 2002: 21(13), 146-150, 153-157.
- 40) The SEMICONDUCTOR industry steps up to the challenges of today, tomorrow - and the day after that. Kim, Irene. *Chemical engineering progress*. 2002: 98(7), 12-14.
- 41) SNAP judgments: digital cameras cost less than ever, but it's still hard to pick the right one. Kaplan, Jeremy A. *PC magazine*. 2002: 21(17), 86-88, 90, 92, 94, 96, 98, 104, 106, 108, 110-112, 114.

CONSTRUCTION INDUSTRY

- 42) ENHANCING integration and innovation in construction. Mohammed Fadhil Dulaimi, *et al.* *Building research & information*. 2002: 30(4), 237-247.
- 43) INVESTMENT in construction and economic growth in developing countries. Lopes, Jorge, *et al.* *Building research & information*. 2002: 30(3), 152-159
- 44) KEEPING Venice afloat: the 'floating' city of Venice sank 200mm last century - and could disappear entirely if the decline is left unchecked. Jones, Simon. *International construction*. 2002: 41(5), 23-24.
- 45) TARGETING 'technology exchange' for faster organizational and industry development. Kumaraswamy, Mohan M. and Shrestha, G.B. *Building research & information*. 2002: 30(3), 183-195.
- 46) TECHNOLOGY transfer through subcontracting in developing countries. Devapriya, K.A.K. and Ganesan, S. *Building research & information*. 2002: 30(3), 171-182.

DAIRY

- 47) IRON and zine in hydrolysed fractions of human milk and infant formulas using an *in vitro* method. Bermejo, Pilar, *et al.* *Food technology*. 2002: 77(3), 361-369.
- 48) MANUFACTURE of yoghurt from stored frozen sheep's milk. Katsiari, Maria C., *et al.* *Food chemistry*. 2002: 77(4), 413-420.

DETERGENTS AND COSMETICS

- 49) SHAMPOO: most of us take clean hair for granted, but there's more to it than 'lather, rinse, repeat'. Giroux, Robin. *Chemical and engineering news*. 2002: 80(15), 42.

ENVIRONMENTAL PROTECTION

- 50) EFFECT of starvation on the performance and re-acclimation of biotrickling filters for air pollution control. Cox, Huub H.J. and Deshusses, Marc A. *Environmental science & technology*. 2002: 36(14), 3069-3073.
- 51) ELECTRONIC waste: concern grows over what to do with the massive amounts of electronic products discarded each year. Hileman, Bette. *Chemical and engineering news*. 2002: 80(26), 15-18.
- 52) FIRE down below. Pearce, Fred. *New scientist*. 2002: 174(2345), 43-45.
- 53) TAIWAN's approach to the litter problem. Tremblay, Jean-Francois. *Chemical and engineering news*. 2002: 80(30), 19.
- 54) USE sustainability metrics to guide decision-making. Schwarz, Jeanette, *et al.* *Chemical engineering progress*. 2002: 98(7), 58-63.

FOOD

Fish and marine products

- 55) NUTRIENT composition of green crab (*carcinus maenus*) leg meat and claw meat. Skonberg, Denise I. and Perkins, Brian L. *Food chemistry*. 2002: 77(4), 401-404.
- 56) NUTRITIONAL quality of spray dried protein hydrolysate from black tilapia (*oreochromis mossambicus*). Azizah Abdul-Hamid, *et al.* *Food chemistry*. 2002: 78(1), 69-74.

Fruits, vegetables and nuts

- 57) CHEWING the fat. Lowe, Ian. *New Scientist*. 2002: 174(2345), 55.
- 58) METAL ion uptake by mushrooms from natural and artificially enriched soils. Demirbas, Ayhan. *Food chemistry*. 2002: 78(1), 89-93.
- 59) NEW sources of dietary myosmine uptake from cereals, fruits, vegetables, and milk. Tyroller, Stefan, *et al.* *Journal of agricultural and food chemistry*. 2002: 50(17), 4909-4915.
- 60) OXYGENATION of bisphenol A to quinones by polyphenol oxidase in vegetables. Yoshida, Mitsuru, *et al.* *Journal of agricultural and food chemistry*. 2002: 50(15), 4377-4381
- 61) PHYSICAL-chemical changes in early dwarf cashew pseudofruits during development and maturation. de Figueiredo, Raimundo Wilane, *et al.* *Food technology*. 2002: 77(3), 343-347.
- 62) STUDIES on antioxidant activity of pomegranate (*punica granatum*) peel extract using in vivo models. Murthy, Kotamballi N. Chidambara, *et al.* *Journal of agricultural and food chemistry*. 2002: 50(17), 4791-4795.

Meat products

- 63) BIOACTIVE amines in chicken breast and thigh after slaughter and during storage at 4 ± 1 °C and in chicken-based meat products. Silva, Cristiane M.G. and Gloria, M. Beatriz A. *Food chemistry*. 2002: 78(2), 241-248.
- 64) SELENIUM accumulation in beef: effect of dietary selenium and geographical area of animal origin. Hintze, Korry J., *et al.* *Journal of agricultural and food chemistry*. 2002: 50(14), 3938-3942.

FOOD ADDITIVES

- 65) ARTIFICIAL sweeteners face sweet 'n' sour consumer market. Hollingsworth, Pierce. *Food Technology*. 2002: 56(7), 24, 26-27.
- 66) DEVELOPMENT of biocatalytic process for the production of C6-aldehydes from vegetable oils by soybean lipoxigenase and recombinant hydroperoxide lyase. Noordermeer, Minke A., *et al.* *Journal of agricultural and food chemistry*. 2002: 50(15), 4270-4274.
- 67) EFFECT of drying and salting on the flavour compound of Asian white radish. Coogan, R.C. and Wills, R.B.H. *Food technology*. 2002: 77(3), 305-307.
- 68) OPTIMIZING sweetener blends for low-calorie beverages. Meyer, Susanne and Riha, William E. III. *Food technology*. 2002: 56(7), 42-45.

FOOD INDUSTRY

- 69) METAL residues in process water used in seafood processing industries. Ashraf, M.P., *et al.* *Bulletin of environmental contamination and toxicology*. 2002: 69(4), 530-537.

FOOD MICROBIOLOGY

- 70) ACRYLAMIDE found in cooked foods: high-level detection by Swedish researchers leads to flurry of government and industry testing. Hileman, Bette. *Chemical and engineering news*. 2002: 80(19), 33.
- 71) DETERMINATION of antioxidant potential of volatile extracts isolated from various herbs and spices. Lee, Kwang-Geun and Shibamoto, Takayuki. *Journal of agricultural and food chemistry*. 2002: 50(17), 4947-4952.
- 72) ACRYLAMIDE worries experts. Hileman, Bette. *Chemical and engineering news*. 2002: 80(27), 9.

FOOD TECHNOLOGY

- 73) FOOD biosensors. Giese, James. *Food technology*. 2002: 56(7), 72-75.
- 74) IMPROVEMENT of gel properties of dried egg white by modification with galactomannan through the maillard reaction. Matsudomi, Naotoshi, *et al.* *Journal of agricultural and food chemistry*. 2002: 50(14), 4113-4118.
- 75) NUCLEAR and isotopic techniques for addressing nutritional problems, with special reference to current applications in developing countries. Iyengar, Venkatesh. *Food and nutrition bulletin*. 2002: 23(1), 3-10.
- 76) NEOTAME: the next-generation sweetener. Indra, Prakash, *et al.* *Food technology*. 2002: 56(7), 36-40, 45.

INFORMATION TECHNOLOGY

- 77) The BIONIC browser: we have the technology to make browsers better, stronger, and faster. Caroll, Sean. *PC magazine*. 2002: 21(18), 116-126, 128.

INSPECTION STANDARDS

- 78) IMPLEMENTING environmental management systems in construction: lessons from quality systems. Ofori, George, *et al.* *Building and environment*. 2002: 37(12), 1397-1407.

IRON AND STEEL INDUSTRY

- 79) PHARMACEUTICAL plants: choose your material. Greene, Rich. *Chemical engineering progress*. 2002: 98(7), 15-17.

MACHINERY AND EQUIPMENT

- 80) FIT to print: inks and pigments business is growing through digital printing and from a desire for UV-curing and special effects in packaging applications. Thayer, Ann M. *Chemical and engineering news*. 2002: 80(18), 23-24, 26, 28, 30.
- 81) GET to know lasers and their roles in plastics. Crosby, Paul. *Plastics technology*. 2002: 48(6), 62-65.
- 82) MOBILE spray rig provides profitable foam, coatings and adhesives spraying. Rizzo, Dave. *Rubber world*. 2002: 226(4), 24-26.
- 83) NEW intermeshing mixer vs. traditional mixers. Nortey, Narku O. *Rubber world*. 2002: 226(4), 32-39.

MANAGEMENT

- 84) CHANGING organizational forms and the employment relationship. Rubery, Jill, *et al.* *Journal of management studies*. 2002: 39(5), 645-672.
- 85) INNOVATION, identities and resistance: the social construction of an innovation network. Harrison, Denis and Laberge, Murielle. *Journal of management studies*. 2002: 39(4), 497-521.
- 86) PRODUCT development tensions: exploring contrasting styles of project management. Lewis, Marianne W., *et al.* *Academy of management journal*. 2002: 45(3), 546-564.

MARKETING AND TRADE

- 87) GLOBALIZATION, trade and LDCs: reflections on the consequences and opportunities of trade liberalization. Emami, Aristotle and Shah M. Tarzi. *The Asian economic review*. 2002: 44(2), 177-192.
- 88) STRUCTURAL inertia, imitation, and foreign expansion: South Korean firms and business groups in China, 1987-95. *Academy of management journal*. 2002: 45(3), 509-525.

MATERIALS ENGINEERING

- 89) SHAPING up: concrete has come a long way since the first concrete high rise was built in Cincinnati, Ohio, in 1903. Price, Kate. *International construction*. 2002: 41(6), 30-31.

MEDICINAL PLANTS

- 90) ANTIOXIDATIVE activity of extracts from mengkudu (*morinda citrifolia* L.) root, fruit and leaf. Mohd Zin, Z., *et al.* *Food chemistry*. 2002: 78(2), 227-231.
- 91) CHARACTERISATION of antioxidative activities of various extracts of *centella asiatica* (L) urban. Abdul Hamid, A., *et al.* *Food chemistry*. 2002: 77(4), 465-469.
- 92) IN vitro shoot organogenesis of *eurycoma longifolia*. Luthfi A.M. Siregar and Chan, Lai Keng. *The Planter*. 2002: 78(915), 289-300.

METALS AND MINERALS

- 93) MAINTAINING a charge: lithium-ion batteries have enjoyed high growth, but experts wonder if sector is running out of power. Tullo, Alexander H. *Chemical and engineering news*. 2002: 80(28), 25-26.

OFFICE AND BUSINESS BUILDINGS

- 94) A CASE study of sub-slab depressurization for a building located over VOC-contaminated ground. Rydock, James P. and Skaret, Eimund. *Building and environment*. 2002: 37(12), 1343-1347.
- 95) EFFECTIVE retrofitting scenarios for energy efficiency and comfort: results of the design and evaluation activities within the OFFICE project. Hestnes, Anne Grete and Kofoed, Niels Ulrik. *Building and environment*. 2002: 37(6), 569-574.
- 96) MITIGATION of extremely low frequency magnetic fields from electrical installations in high-rise buildings. Burnett, John and Yaping, Patrick Du. *Building and environment*. 37(8-9), 769-775.
- 97) ON the potential of retrofitting scenarios for offices. Dascalaki, E. and Santamouris, M. *Building and environment*. 2002: 37(6), 557-567.
- 98) A NUMERICAL investigation of effects of a moving operator on airflow patterns in a cleanroom. Yang, Suh-Jenq and Fu, Wu-Shung. *Building and environment*. 2002: 37(7), 705-712.
- 99) THERMAL simulation of an Australian university building. Fuller, R.J. and Luther, M.B. *Building research & information*. 2002: 30(4), 255-263.
- 100) WORLD beater: at 508m high, the Taipei financial center hopes to be the world's tallest building – for the time being at least. Smith, Glenn. *International construction*. 2002: 41(6), 8-9.

OILS AND FATS

- 101) OLIVE oil as a functional food: epidemiology and nutritional approaches. Stark, Aliza H. and Zecharia Madar. *Nutrition reviews*. 2002: 60(8), 170-176.

PACKAGING

- 102) CAST PP opens the door to speciality films. *British plastics & rubber*. 2002: May, 25-26.
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PALM OIL

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PEST AND PEST CONTROL

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PHARMACEUTICALS

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PLASTICS AND POLYMERS

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- 127) OPTIMAL reaction conditions for the minimization of energy consumption and by-product formation in a poly(ethylene terephthalate) process. Ha, Kyoung-Su and Rhee, Hyun-Ku. *Journal of applied polymer science*. 2002: 86(4), 993-1008.
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- 131) RECYCLING of postconsumer poly(ethylene terephthalate) and high-density polyethylene by compatibilized blending. Pawlak, A., *et al. Journal of applied polymer science*. 2002: 86(6), 1473-1485.
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PUBLIC HEALTH

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RECYCLING

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RESEARCH AND DEVELOPMENT

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RUBBER

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TEXTILE INDUSTRY

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