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INSTITUTE OF TROPICAL FORESTRY AND FOREST PRODUCTS

Centre of R&D in Tropical Biocomposite and Forest Canopy Management

"GREEN INNOVATIONS FOR SUSTAINABLE FUTURE"

From The Director's Table

The growing global emphasis on environmental responsibility can feel daunting to most people; "How," they ask, "can I make a difference? I'm just one person." That's an understandable question, but there's good news with the answer: Every little bit helps, and everything you can do to live a more environmentally responsible and green-friendly life has a positive benefit for the planet and for the people around you. Saving the planet is about planning a better future for generations to come.

There are many types of green concept nowadays. These include green economics, green product, green technology, green innovation, green marketing, green business and many more. Going green is not just about preserving the environment, but it is also about nurturing one's behavior towards cleaner and healthier lifestyle through a more efficient usage of resources.

As a research Institute that deals with lignocellulosic materials, INTROP is very focus in elevating the use of fibres (wood and non-wood) in the country, particularly in enhancing the existing biocomposite products, as well as in developing new ones through a more efficient process manufacturing and sustainable business environment. Hence **"GREEN INNOVATIONS FOR SUSTAINABLE FUTURE"** is indeed a slogan to reflect the nature and direction of INTROP's R&D. In this regard, it is very crucial for the researchers to be more innovative in their research approach. For example, we need to establish partnerships with the industry because budgets are limited, venture capital is limited and executive leadership is focusing more and more on immediate returns. There is no point of reinventing the wheel. This is how businesses can work toward sustainability. Although it is difficult to convince the industry, we, researchers, should not be dampened by such feats but continue to serve the country by the only thing we good at which is doing research.

FROM THE EDITOR

Words from Editor

In the past, the major need of people the world over was land that can grow crop. With the rapid to growth in population, large number of trees were cut for fuel, and to large tracts of land converted agricultural cultivation. And gradually with the clearance of forest through over-population and the accumulation of various chemical elements in the atmosphere the spectare of global warming and associated environmental problems hegan with pleague mankind. With increasing awareness of the threatened environment, it's timely for us to take a fresh look at some possible scenarios of how we can conserve our usage of mother earth's resources.

The United Nations Millennium Development Goals (MDGs) seek to achieve eight clearly defined goals for a better world. In particular, Goal 7 seeks to 'Ensure Environmental Sustainability'. Green environment is something that nations endeavor to achieve just to secure a sustainable future. This is a dream that is yet to be attained by most nations. We cannot continue to deny the reality that, reality of myriad ecological concerns, of aggravating poverty and of coming secures unsustainability. The reality is that, if unchecked we may be heading towards a failed planet. It is however never too late for our audacity of hope, our quest for a sustainable and greener tomorrow. There is no right time for this but only the right decision for our environment. We must choose what is best for planet earth, for our now endangered environment. Our good fortune should come with a continuing responsibility—to protect and sustain the air, land, and water that is so quanterial to what we call our home.

Our interactions with the nature are complex. Our health, economic prosperity, and way of life are all affected by the quality of the environment. We recognize its intrinsic values and the importance of natural spaces and biodiversity. The responsibility should be spread widely across the planet. The environment simply cannot be effectively managed and protected without the commitment of all stakeholders. So, think green and act green.

A Moment With Dr. Khairul Zaman bin Hj Mohd Dahlan

Dr. Khairul Zaman bin Hj Mohd Dahlan, is the Director of Radiation Processing Technology Division in Nuclear Malaysia. He is the head of the division that spearhead the growth and development of R&D involving radiation technology since 1991. Under his leadership, Radiation Processing Technology has evolved and developed from zero ground to the current level with well equipped laboratories comprising of polymer processing, polymer testing, surface/thermal and water analysis, surface curing and testing, natural polymer and nano-materials characterization. He is also responsible in the setting up of underbeam handling system for wire and cable/tubing at ALURTRON (3.0 MeV electron accelerator), Nuclear Malaysia. Realizing the importance of the transfer of technology to industry, he has set up a pilot scale facility for polymer processing that comprising compounder, extruder and injection moulding machine with the purpose to demonstrate the capability of the materials that was developed by the researcher can be processed at the pilot cum industrial machine. His latest great contribution to Nuclear Malaysia and country is the introduction and setting up of laboratory on the application of radiation in nanotechnology under RMK9. Dr. Khairul Zaman is specialized in the field of radiation processing of the polymer, polymer blend, and composites. The 24 years experience in this field was something that cannot be questions on how great his contribution to Nuclear Malaysia and more of to the nation can be. On top of that he has made much collaboration with foreign and local agencies in relation to the radiation technology. Some of them involve the application of radiation with the nanotechnology and electron beam (EB) technology for treatment of wastewater. Through all of this, he has been invited throughout the global as the national representatives on many occasion regarding the nuclear and radiation technology.

Institute of Tropical Forestry and Forest Products (INTROP), Universiti Putra Malaysia (UPM) is not new to Dr. Khairul Zaman. INTROP and Nuclear Malaysia through its collaboration have initiated many projects in relation to the polymer products in these recent years. This collaborative achievement has marked a new partnership in applying nuclear and radiation technology to one of INTROP's field of specialization, the Natural Fiber and Polymers, or better known as the Green Technology. INTROPica editorial board has organized an interview with Dr. Khairul Zaman to honour his contribution, achievement and knowledge sharing with INTROP all this while before he can call it a day this September 2011. Dr. Khairul Zaman was interviewed by the Editor of INTROPica himself, Prof. Mohd Basri Hamzah on something that has been very familiar with him during his working days, the Green Technology.

" Natural polymers which are indigenous to our country are the most invaluable asset that can bring direct benefits to people and to the economy of our country."

Dr. Khairul Zaman bin Hj Mohd Dahlan
Director Radiation Processing Technology

INTROP: How do you define 'green technology' in your own perspective in particular the use of nuclear technology. How does the nuclear and radiation technology can be considered as green in Nuclear Malaysia?

DR. KHAIRUL: When we talk about green technology, we are talking about technology that is friendly to the environment.

In Nuclear Malaysia, we are using nuclear technology in association with the ionizing radiation (radiation generated or induced by either radioactive material or by machine). Radioactive element can be generated by man made in the nuclear reactor such as , copper 60 and cesium 127. For example, cobalt 59 is a stableelement that when we put inside the nuclear reactor, it becomes cobalt 60 which is radioactive element. The half life of Cobalt 60 is about five (5) years. Within that half life, cobalt 60 will continuously generate ionizing radiation known as gamma in the process to stabilize it self to stable element, Nickle 60. We make used of these gamma rays and also electrons that can be generated from electron accelerator for processing of polymeric materials or treatment of waste water or gaseous. . Radiation processing is considered as a green process in comparison to other processing method such as the usage of chemical, heat and enzyme, that always produce residue that you need to get rid off or a process that required a lot of energy to operate. Radiation processing is a physical process, it can be used in many applications such as in agriculture, industry medical, and others.

INTROP: How do you see 'green technology' in the global perspective in the next few decades? And how do you see 'green technology' evolving in Malaysia, including the use of nuclear technology.

DR. KHAIRUL: Green technology is an emerging technology. It touches a very basic human needs to live healthy. Green technology covers raw materials, process and products. There is a move by some quarters to push requirement for green materials, green process and green products, which means the whole value chain should be free from polluting environment. It is very good concept but it needs to be taken step by step and wherever possible. In some cases, although the final product is not totally green, but if it can be recycled or reused or reprocess orreduced or recover that is good enough as long as it can be controlled and managed by man. In the selection of technology, one has to consider many aspects in particular long term benefits to people, technology, economy and environment.

It is applied to Nuclear Technology too. As far as non-power application of nuclear technology is concerned, no doubt that it has been proven beneficial to mankind with no negative impact to environment, in many sectors of life such as nuclear medicine, radiation processing in industry, radiation sterilization, mutation breeding, etc. As for power application, nuclear technology remain as an alternative and viable energy sources.

INTROP: What has been the area of focusing between INTROP and Nuclear Malaysia in its collaboration made before? How does the technology being used by both agencies was considered as green?

DR. KHAIRUL: Nuclear Malaysia has conducted many projects collaboration with INTROP in using the radiation (ionizing radiation or UV) for processing of biocomposites and for curing of coating of the products such as table top made from fibre, particleboard and many more (specifically used on furniture and wood based products). With the used of radiation, the coating material usually used in furniture manufacturing will perfectly cured without the release of any dangerous solvent (usually used for material dilution) vapour after the process. Other technique such as the acid and heat curing process, some solvent will evaporate (the removal of solvent will makethe coating material become solid) and release to the environment and can cause catastrophic problem to human and nature. That is why the ionizing radiation process (ex. Electron beam) and UV curing process considered as green (environmental friendly). Although this technology has been available for many applications, people still opted to use a much cheaper process which is not environmental friendly.

Nuclear Malaysia and INTROP have also developed radiation processing technique for making agro-fibers polymer composites. Many MSc and PhD students have completed their thesis using oil palm fibers, coconut fibers, rubber wood fibers, wood flour, bamboo fibers and kenaf fibers in making biocomposites processed by using electron beam technology. Project on using kenaf fibers – polypropylene composites is now being further developed into a pilot scale processing. Besides focusing on high value added projects which have high potential for commercialization, the project collaboration between Nuclear Malaysia and INTROP have also contributed to human capital development with the graduation of many knowledge workers with MSc and PhD degrees.

Besides, the green technology that we are using right now, we are also using green, indigenous and natural materials such as Sagu starch (polysaccharides), shrimp shell (chitosan), and oil palm. For example a product made from starch (Sagu Starch) has been commercialized by a company in Sarawak to produce HydroGel Face Mask (used to moisturize skin). The radiation process is used also to simultaneously sterilize the face mask from micob and crosslink the hydrogel to make it firm. Another example is Chitosan. It is a big molecule extracted from shrimp shell and by using the radiation process; the big molecule will degrade into a smaller molecule known as oligo-chitosan. This extracted oligo-chitosan used to replace some synthetic product for agriculture purposes. It can also induce the immune system of the plant.

The plant will start to produce its antibody. Another example was the radiation curable palm oil acrylate known as the OPV that can be used in the palm oil industry. OPV (Over Print Varnish) used to create a glossy effect and also as the final protection layer on the printing paper usually on the front cover of a book or magazines. This newly found OPV was very friendly even to the user as it can be used with the conventional procedure while mixing the OPV using bare hands.

INTROP: Green technology has a wide scope covering energy, building, chemistry, and many more. Some say that 'green technology' is at its infancy. Obviously a lot more will be discovered in this age of discovery. You may have mentioned some in the earlier question. What other major discoveries you may see on the horizon?

DR. KHAIRUL: In Malaysia, we have so many indigenous materials especially the green material such as plant fiber beside natural polymers that I have mentioned earlier that needs to be exploiting for more uses. Today, we can see many works have been directed towards herbs and plants for essential oils. Biotechnology is given high priority by the government. All these are very much related to green materials, green process and green products. Government is also pursuing green energy by establishing the Ministry that handling and focusing on green technology. Malaysia is not that far from well develop nation as far as green technology is concerned. asset that can bring direct benefits to people and to the economy of our country. Being indigenous, renewal,

INTROP: Given the assets that we have in this country, in which areas you predict we may benefit most from this technology?

DR. KHAIRUL: As I have stated earlier, natural polymers which are indigenous to our country are the most invaluable asset that can bring direct benefits to people and to the economy of our country. Being indigenous, renewal, abundant and green, natural polymers have many to offers. Sagu which is only known for food, is now finding its way in the cosmetic industry. Palm oil which is well known in food, cosmetic and oleochemistry industries, and now is being studied its potential to be used in biomedical sectors as nano carrier. Many others research are being conducted to explore further modification of natural polymers for various potential applications in agriculture, medicine and industry.

INTROP: Any last words or updates you have on 'Green Technology'?

Dr. Khairul: Here in Nuclear Malaysia, our division, the Radiation Processing Technology Division, has been awarded by the International Atomic Energy Agency (IAEA), as the collaborating centre on radiation processing of natural polymer since 2006 – 2009) and the award has been extended to radiation processing of natural polymer and nano-materials, beginning Oct 2010 till 2014 .

In addition to that Malaysia has been elected as the Lead Country Coordinator for the regional project in relation to radiation processing and I am the responsible person to coordinate such project in this region which comprises 12 member states. Under this Regional Cooperation Agreement (RCA) project, the focus area in the past 10 years was the application of radiation technology in natural polymer (green polymer). Under this project, the member countries have successful developed several products such as sago/chitosan/carageenan based hydrogel for wound dressing, sagu hydrogel for face mask, oligosaccharides for plant gowth promoter and plant elicitors, oligosaccharide as fruits preservative, starch based superwater absorbent for agriculture applications and toxic metal absorbent. It is one of the most successful regional project cooperation under the IAEA program. It is therefore radiation technology has been demonstrated as a useful and powerful technology for processing of green materials into green products with high value added.

THE SIGNIFICANCE OF RECREATION ON THE ECONOMY

Recreation has been contributing to the development of the economy. This contribution can be viewed in terms of employment impacts and expenditure impacts that link to other relevant industries in the economy (Ahmad, 1993).

When a person travels for recreation, he or she has direct expenditure on the travel associated costs (air fare, petrol, toll and etc), on food as well as accommodation for overnight trips. In some cases, he or she may spend on purchasing or renting certain recreational equipments and/or services. For organized trips, tourists may pay for tour packages. These expenditures, substantially contribute to the development of other industries involved in supplying materials, goods and expertise through the multiplying effects. For example, the petroleum industry supplies power and energy, agriculture provides raw materials for food and beverage industry, the educational sector is involved in training professionals and certified personnel and the government agencies in managing public recreational areas.

In 1999, recreation and tourism generated over $3.5 trillion in gross domestic product (GDP) of the United States (US). World Travel and Tourism Council estimated that this sector provided employment for 200 million people and, accounts for almost 12% of world's GDP and the leading producer of tax revenues (Crossley et al., 2001). Meanwhile, in 2001 the industry alone created 393,600 jobs representing 4.2% of the total employment in the market worldwide. Nevertheless, the multiplier effects in the subsectors created 822,900 jobs representing 6.8% of total employment. By 2010, this should grow to 1.0 million jobs, or 9.6% of total employment (WTTC, 2002).(*Table 1*) lists various subsectors related to recreational goods and services which provided support to the US tourism industry in 2002. The US Census Bureau estimated $844.6 billion in expenditure levels, numbers of businesses and employees as accumulation of subsectors mostly in the categories of recreation, leisure and tourism. It was also estimated that Americans spent another $198 billion at gasoline stations, $223 billion at departmental stores and a sum of $150 billion for home computers and software, on-line and mail order shopping, taxi and limo services, residential swimming pools and many other products and services (Crossley et al., 2001).

In Malaysia, the recreational industry is not clearly designed. The impact of recreational activities towards national economy lies within the tourism umbrella. As discussed earlier, one substantial direct impact is on the national economy which can be seen in terms of expenditure impacts. For instance, the expenditure impact is clearly shown by the composition of tourists' expenditure pattern in Malaysia, which contributes to other related sectors (*Table 2*). The pattern indicated that accommodation was the biggest component increasing from 32.0 percent in 1995 to 32.8 percent in 2000 (GOM, 2005).

In 2005, expenditure related to the recreation industry was the highest for the country rewarding 33.1 percent of overall spending (GOM, 2006). The average per diem expenditure of tourists increased by 20.5 percent from RM255.90 in 1995 to RM308.36 in 2000 (GOM, 2006). Meanwhile, the average per capita for tourists' expenditure in Malaysia, which was RM 1,228 in 1995,increased to RM 1,939 in 2002, an increment of 58% (Public Bank, 2003).Malaysia has always promoted recreation though the tourism industry as proven by the vigorous promotional programmes and physical development throughout the country. The year 1998 had been declared as the Year of Sports and Recreation. During the campaign, more than 240 events and activities related to sports, nature and adventure as well as celebrations were planned and organized. The opening of the Kuala Lumpur International Airport (KLIA) in 30 June 1998 greatly boasted the tourism and recreation industry. In 2000, airline traffic to and from Malaysia increased by 11.7% to a record 32.7 million passengers (WTTC, 2002).

Table 1: Recreation, Leisure and Tourism Expenditure (US) in 2000

Category	Sales ($ Billion)	# Establishment (thousands)	# Employees (thousands)
Eating and drinking places	251.9	486.9	7,755
Traveler accommodations	95.0	47.1	1,646
Airline transportation	88.9	---	---
Motion picture services	55.9	22.2	276
Home electronics / entertainment	32.2	18.3	176
Lawn and garden	31.7	21.2	165
Liquor stores	22.7	29.6	131
Book and music stores	20.6	22.8	198
Sporting good retail	20.0	24.4	176
Tax exempt organization	19.6	19.5	380
Gambling industries	15.5	2.1	168
Auto rental	14.8	4.4	102
Gift, novelty & souvenir	14.5	37.3	208
Hobby, toy & game	14.4	10.8	112
Spectators sports	13.7	3.9	92
Recreation vehicle dealers	10.1	3.0	29
Boat dealers	8.9	5.3	35
Golf courses / Country clubs	8.6	8.5	160
Amusement parks	8.4	3.3	138
Fitness & sports centers	7.9	16.6	256
Arts & sports promoters	7.5	5.1	65
Video rental	7.2	2.7	150
Artists & performers	6.4	11.0	27
Athletics footwear stores	5.9	5.3	50
Pet stores	5.5	8.3	61
Photo finishing labs	5.5	7.1	184
Performing arts companies	5.3	5.9	52
Water passenger transport	4.4	0.4	23
Musical instrument stores	3.8	4.5	30
Sewing & needlework stores	3.1	6.6	45
Art dealers	3.0	5.7	19
Bowling centres	2.8	5.6	88
Pet shops	2.7	7.2	38
Marinas	2.5	4.2	22
Camera shops	2.3	2.8	18
Scenic transport	1.9	2.3	23
Charter bus service	1.8	1.5	31
Radio & T.V repair	1.5	5.1	37
R.V. parks and campsites	1.4	4.1	16
Luggage/leather stores	1.4	2.1	9
Other recreation rental	1.4	4.5	22
Recreation and vacations camps	1.3	3.5	19
Sports and recreation camps	1.3	5.7	33

Table 1: Recreation, Leisure and Tourism Expenditure (US) in 2000 (cont)

Category	Sales ($ Billion)	# Establishment (thousands)	# Employees (thousands)
Skiing facilities	1.3	0.4	59
Fine arts schools	1.0	6.2	32
Other recreation/leisure	7.1	14.5	116
Totals	$844.6	955.5	13,472

Sources: U.S. Census 2000

Table 2: Composition of Tourist Expenditure in Malaysia, 1995 and 2000

Item	1995	2000
Accommodation	32.0%	32.8%
Shopping	21.0%	23.1%
Food and Beverages	18.0%	19.5%
Local transportation	8.0%	7.1%
Domestic airfares	5.0%	4.6%
Organised sightseeing	4.0%	4.2%
Entertainment	6.0%	5.0%
Miscellaneous	6.0%	3.7%
Total	100.0%	100.0%
Total (RM Million)	9,174.9	17,335.4

Source: Eight Malaysia Plan

The opening of a Low Cost Carrier Terminal (LCCT) in 23 March 2006, enhances the volume of air traffic to and from the country. The terminal is mainly to cater for a low cost carriers which mainly operate in within the SEA and Asia Pacific regions.

The Malaysian government has emphasized the significance of tourism industry in Malaysia in the Ninth Malaysian Plan 2006-2010 (RMK9). It is highlighted in Chapter Eight (Realization of Tourism Potential) of the plan, where the tourism sector is focused on enhancing Malaysia as one of global tourism destinations and on promoting domestic tourism. In the RMK 9 budget, the Malaysian government increased the tourism allocation to RM1.847.9 billion, compared to the RM783.6 million in the preceding Eighth Plan (2001-2005), a 58% increment. The Visit Malaysia Year in 2007 (VMY 2007) in 2007 was to further promote inbound tourism and domestic tourism. With an allocation of RM149 million, the VMY 2007 aimed at encouraging international tourists to spend larger and stay longer in Malaysia. To achieve this, the country has to upgrade and diversify tourism products and recreational activities. Over 50 major events and festivals were planned throughout the country during that year.

Over the years, recreation brings positive impact in boosting the economy and it has undoubtedly proven to be a sustainable commodity. This article basically discusses the contribution of recreation to the national economy from a certain viewpoint. The role of the sector should be explored further in the future to identify other benefits it might contribute. Now, from the article we understand the importance of recreation, perhaps, we can play our part by actively participate in recreational activities and/or events as we know this will contribute to the nation's economy.

By : Dr. Syamsul Herman bin Mohammad Afandi

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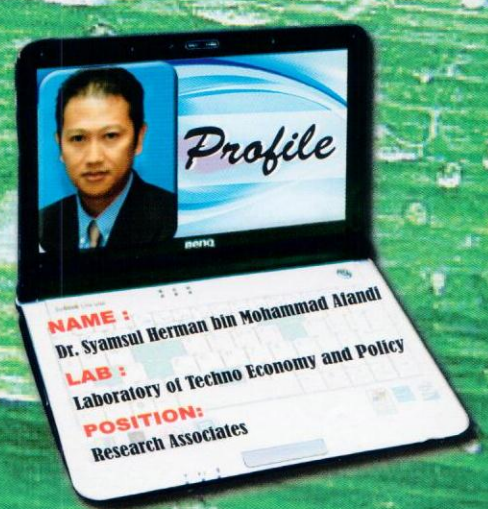


CONTRIBUTING TO BIODIVERSITY TAKES THE GEOWEB ROUTE

Going green generally means practicing an ecologically responsible lifestyle and decision making which can help protect the environment and sustain its natural resources for current and future generations. If actions such as turning off lights and electronics when not in use or opting for products made from recycled materials appear economically and environmentally self evident, the benefits of choosing right species for greening home gardens or residential landscapes are often less apparent especially for generations grown-up in places that have been stripped from native vegetation. Indeed, in a context of increasing extension of urban landscapes, residential and development areas still contain a significant proportion of specific biodiversity that can be managed for the valuation of cultural heritage, economic development as well as for the restoration of threatened species occurring outside the network of protected areas. In these circumstances, collective knowledge about the value, specificity and ecology of surrounding fauna and flora becomes crucial since individual and collective decisions that will be made during the next decade are likely to shape for a long period, if not indefinitely, the services that will be possible to benefit from. Recently, collaborative Web tools handling geographic data have shown a great potential for gathering and sharing biodiversity data. This approach has been started and exemplified by the development of citizen sciences Web platforms involving individual volunteers or networks of volunteers in different projects including bird nest watching or the San Francisco urban map project where citizen contribute mapping and measuring San Francisco's urban trees on a website (http://www.urbanforestmap.org/).

Contributing to collective knowledge of landscape forest biodiversity

In Malaysia, any citizen can currently support public awareness on residential forest biodiversity by identifying trees and entering them in a spatial database designed at INTROP-UPM. This database which is open to the public is at present accessible through the "Pericopsis" Web portal at http://pericopsis.org/. Tree distributions can be visualized on a Google map and accessed through basic GIS functions which are able to filter geographic distributions and tree species. Pericopsis.org is designed on the principle of a "Wiki" and users can edit and change contributions of each other if they think they are inaccurate. Besides, the database developed at INTROP is planned to be interoperable with web portals of public and professional organisations desiring to build and share their own spatial databases on tree locations UPM campus tree name and locations collected by UPM Agribio Resources Division are for example will be made accessible through both Pericopsis.org and UPM Web portals in the near future.

If successful, a large and freely accessible database of tree locations updated by multiple stakeholders will be both an educational tool and an evidence-based support for planning and coordinating decisions for forest biodiversity management at scales that integrate local ecologic functions. By making spatial relationships more apparent, collaborative GIS web portals may shift preferences for only locally rewarding management decisions that bring long term benefits for natural resources and to the overall appreciation of the community. As illustration, the use of exotic trees in urban forestry or private gardens may locally increase diversity and constitute a rational choice since their adaptability, flowering and architectural patterns are well known. Nevertheless, their impact on diversity maybe adverse on a global scale when exotics do not integrate functions of local ecosystem, interrupt corridors between protection areas and contribute to the loss of cultural identities.

Getting involved on pericopsis.org

As on most Web 2.0 portals entering data requires the user to be registered with a specific and password protected identification name. The identification name will be associated to entered tree locations and tree names, edited tree names and personal area of survey delimited by a polygon drawn on a Google map. A personal area of survey permits you to rapidly find back an area of interest and to share it with other users. It also allows for possible changes made by other contributors or to rapidly detect possible acts of vandalism. Recording an area of survey is straight forward:

1. After signing-in and accessing the contribution page at (http://pericopsis.org/trees/enginposition.php), draw a yellow polygon over your area of interest such as your home garden by clicking directly on the Google map ***(Figure 1)***. If needed, the polygon can be erased by clicking on the "clear map" button and drawn again.

Figure 1. Polygon drawn by clicking on the map

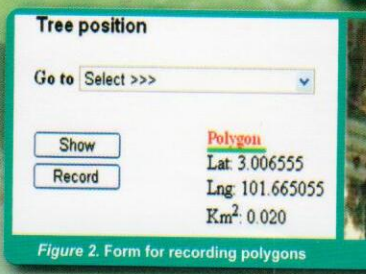


Figure 2. Form for recording polygons

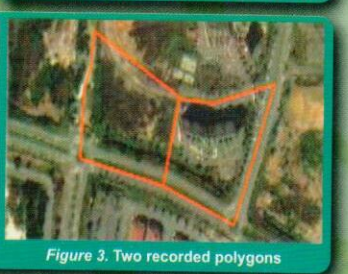


Figure 3. Two recorded polygons

2. Click on the word "Polygon" and the buttons "Show" and "Record" will appear ***(Figure 2)***. Pressing "Record" will record the drawn polygon under your identification name and pressing "Show" will show in red any recorded polygon that is within the yellow polygon ***(Figure 3)***.

Recording a new tree

The location of a new tree is indicated by moving on the on the map a red symbol *(Figure4)* that appears after pressing the "New tree" button. Once the red symbol is on the desired position and no other tree is on the same place, click on the "Check" button and a green tick sign should appear. Recording a tree you to assign a scientific name. The form for scientific names is displayed by click-ing on "Scientific name". On the form, select a name level, enter the corresponding name part and click on "Check" to verify if the name exists in the Pericopsis database *(Figure 5)*. If yes, a green tick should appear. If not, you need first to enter your name in the database.

Figure 4. Symbol indicating new tree position.

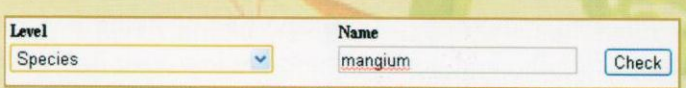


Figure 5. Example: checking if Acacia mangium is in the database

Entering a new "scientific" name in the database

Pericopsis is a Wiki and its database is empty at the origin. New scientific tree names need to be validated before being accepted. If the name does not exist in the Pericopsis database, it needs to be validated using the ©International Plant Name Index (INPI) database that becomes accessible by clicking "Check INPI" *(Figure 6)*. Infraspecific names are handled on the same principle as the species name and validated by the IPNI database. Epithets **subsp.**, **var.** and **f.** that distinguish respectively subspecies , varieties and forma are selected following an query on a infraspecific name if epithet has not been chosen.

If there is no botanical name for a hybrid, a second name can be associated by checking the radio button "(x) Hybrid" in the "Scientific name" form. The radio button "(+) Grafting" is used when the double name is related to a chimera.

Cultivars or cultivated varieties do not follow the system of botanical naming and are not available in the IPNI database. New cultivars need to be entered with an internet link that gives some information about them. The form for cultivars is obtained by clicking on "Infra-specific" in the IPNI form. The species and genera corresponding to the cultivar need to be validated again in the IPNI window even if they already exist in the Pericopsis database.

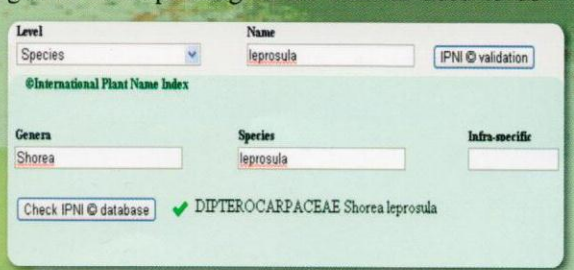


Figure 6. Example where Shorea leprosula is not in the database. The name is entered using the International plant Name Index form.

Validation of a new tree

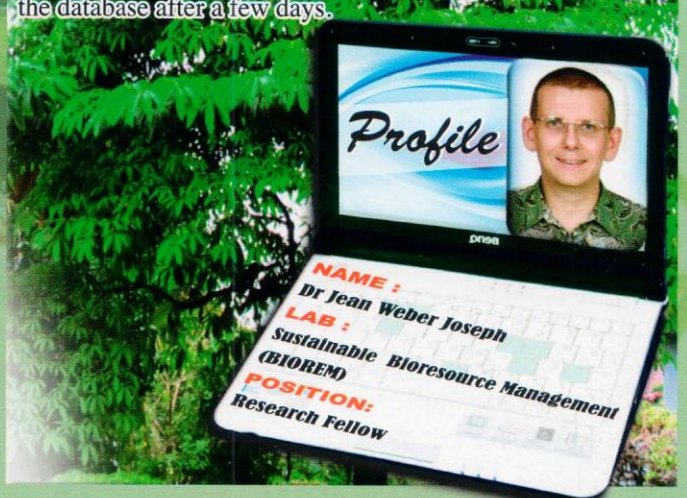
Other entries such as "Common name", "Evaluation" and "Comment", are optional. Clicking on the title shows and hides the corresponding forms. For the Diameter at breast height (DBH) value, the tree circumference instead of diameter can be entered after clicking on "Diameter at breast height (DBH)". Comments are limited to 300 words. The common names need to be associated to a country where they are in usage. The button "Validate" can only be pressed tree scientific name and position are given and confirmed by green ticks.

Rhapis excelsa – Serdang Palm – Southern China and Taiwan

Editing existing trees

Alstonia angustifolia – Pulai – Southeast Asia

All attributes except tree locations can be edited. For editing, click "Edit tree". Changes will only take into account the forms that have been checked. Trees to be edited should be selected on the map as a white marker. Changes are validated using Validate. Successful validation is confirmed by a green tick and can be checked by reloading the trees on the map. Editing also permits removed of cut trees by marking them as dead under "Evaluation" and to correct possible vandalism. Trees marked as dead will be automatically be removed from the database after a few days.

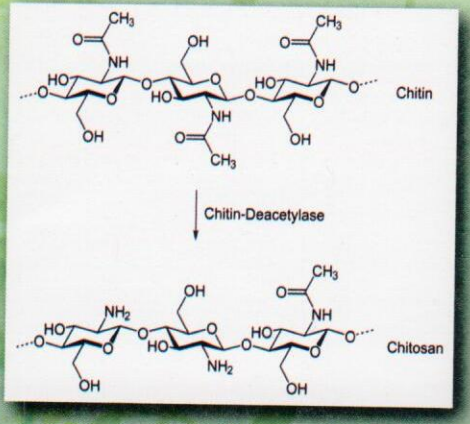


CHITOSAN : AN ATTRACTIVE BIOPOLYMER FOR DIFFERENT APPLICATIONS

Chitin, a polysaccharide similar to cellulose, is the earth's second most abundant polysaccharide after cellulose. It composed of N-acetyl-D glucosamine and generally discarded as industrial waste in the form of leftover seafood crustacean, mainly shrimps, prawns, crabs, and lobsters.

Chitosan is the N-deacetylated derivate of chitin, although the N-deacetylation process almost never complete depending on the degree of deacetylation (DAC). Chitosan and chitin are polysaccharide polymers containing more than 5,000 glucosamine and acetylglcosamine units, respetively. They inherently have specific properties of being environmentally friendly, and nontoxic and are low-cost polymers.

Chitosan has many physicochemical (reactive OH and NH2 groups) and biological (biocompatible, biodegradable) properties that make it an attractive material for use in various applications, ranging from pharmaceutical and cosmetic products to biosensor and water treatment. However, application of biopolymers such as chitosan as an electrical or optical material has rarely been reported. Applications of biopolymers in electrical devices are not only interesting but also important for environmental safety. (Yamada and Holma, 2005, Abdi et al, 2010). It has been reported (Abdi et al, 2010) that chitosan can enhance electrical conductivity and shielding effectiveness (SE) of polypyrrole. During the past decade, Chitosan as an attractive natural biopolymer has been used as immobilization matrix of protein to prepare biosensors. This biopolymer is one of the most promising immobilization matrix due to its excellent membrane-forming ability, good adhesion, nontoxicity, high mechanical strength, and hydrophilicity (Lin et al, 2004).



Molecular structure of chitin and chitosan

One of the significant developments in the new range of applications is the study of the ability of chitosan, as a potentially major environmental treatment material, to remove metal ions from waste waters. The amino group of chitosan has the ability of adsorbing metal ions from industrial waste waters through chelation. Chitosan and UV/TiO2 was used to degrade textile waste water by Chenl et al (2010). This biopolymer was also mixed with surfactants, to finish fabrics in textiles with the aim enhancing the color fastness and fixing dyeing (Najafi et al., 2009).Chitosan can stimulate growth and increase yield of plants as well as induce the immune system of plants to improve their disease and insect resistant ability. This macromulecule acts as the carbon source for microbes in the soil, speed up the transformation process of organic matter into inorganic matter and assists the root system of plants to absorb more nutrients from the soil. It was shown that chitosan has a considerable effect on rice production. Boonlertnirun et al (2008) showed that application of chitosan by seed soaking and soil application four times throughout cropping season significantly increased rice yield over the other treatments.

Chitosan and other hydroxymethyl derivatives are also useful in paper making and biodegradable packaging material for food wrap and other product. The paper produced with chitosan has a smoother surface and is more resistance to moisture. The effect of chitosan as sizing agents to enhance surface properties of kenaf paper was studied by Ashori et al (2005).

They clearly showed that the addition of chitosan to a sheet formed from beaten fibres had excellent improvement in surface properties for printing papers and surface smoothness. Some attempts were made to modify and strengthen the chitosan properties. Kenaf dust was used as a reinforcing agent in chitosan matrix. However, it was shown that incorporation of kenaf dust into chitosan has reduced the thermal stability of the chitosan film (Julkapli et al 2010).

Chitosan is thought to mix with fat and then trap fat droplets in the stomach, preventing it from being broken down by pancreatic lipase (Gades et al, 2005). But these results were mainly are based on animal studies where very large doses of chitosan were administred, does not normally given to humans. In fact, some researchers have observed chitosan intake in short-term studies not significant by affecting body weight or fat binding capabilities. Other studies have reported the fat binding effects of chitosan on men, but there were no effects on women (Gades et al, 2003). Although some fat binding and weight loss effect by administered can be achieved, results are only evident over long-termconsumption.

Unlike most of other hydrocolloids which are polyanions, chitosan is the only natural cationic gum that becomes viscous on being neutralized with acid. It facilitates its interaction with common integuments (skin covers) and hair. Composition based on chitosan or other derivatives are used in creams, pack material, lotions, nail lacquers, foundation, eye shadow, lipstick, shampoo, cleansing materials, and toothpaste. Chitin and chitosan are fungicidal and fungistatic in nature and it is believed that they may be used to inhibit fibroplasias in wound healing and to promote tissue growth and differentiation in tissue culture. Fibers made of chitin and chitosan are useful as absorbable structures and wound-dressing materials. It was shown that wound dressing made of chitin and chitosan accelerates the healing of wounds by about 75% (Pardip et al, 2004).

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OIL PALM BASED BIOMASS AS THE GREEN ENERGY SOURCES IN MALAYSIA

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Introduction

Malaysia is blessed with plentiful and relatively cheap supply of conventional fossil energy resources such as oil, gas, and coal which is currently quite sufficient for the country's requirement. With our ownership of some large oil fields has enabled, the government to subsidize petrol with up to 50 cent per liter to help the local industries to flourish. Past and current economic growth in the country was primarily driven by fossil fuels and little attention has been paid on alternative energy sources. However, like most industrializing countries, Malaysia too, faces the unavoidable challenges of sourcing new sources of energy for her future electricity generation.

Malaysia's target is to generate five percent of its electricity from renewable energy sources by 2005 and decrease reliance on natural gas, which is currently the primary generation fuel. Malaysia currently has approximately 13 gigawatts (GW) of electric generation capacity, of which 84% is thermal and 16% is hydroelectric. The disproportionate dependence on gas for thermal generation is a growing national concern over the eventual depletion of this particular non-renewable resource in the future. Alternative renewable energy could also be cheaper in the long run as natural gas is expensive to produce. (Chuah and Azni, 2004).

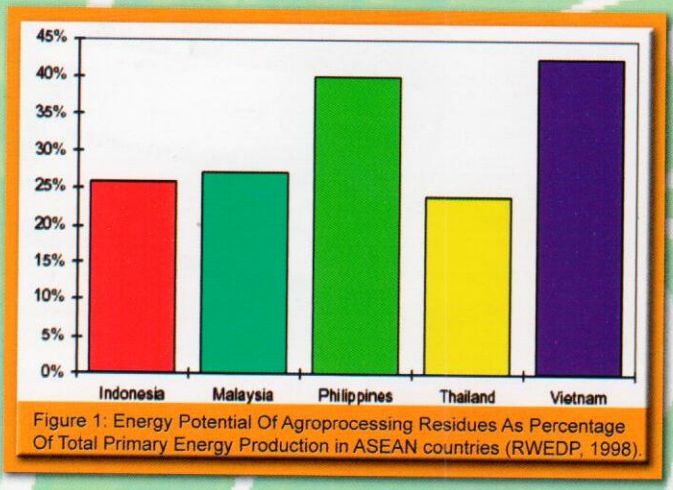

Figure 1: Energy Potential Of Agroprocessing Residues As Percentage Of Total Primary Energy Production in ASEAN countries (RWEDP, 1998).

Renewable energy has been developed to varying degrees in Malaysia. The most extensive study on the use of biomass has been on palm-oil wastes, which are used to meet energy requirement of the palm-oil mills and electricity needs of the workers (EPU, 1999). Malaysia has already generated nearly 200 MW of power from renewable sources in palm oil plantations as part of the effort at biomass utilisation (PTM, 2004). However, this power was mainly for localized use and not connected to the national distribution grid. New plants generating this new energy source should have fed into the national grid during the 8th Malaysia Plan (RM8), in 2001-2005. As incentives the government has offered tax breaks, investment allowances and waiver on import duties of equipments used in renewable energy plants. *(Figure 1)* shows the energy potential of agroprocessing residues as percentage of total primary energy production in ASEAN countries.

Biomass in Malaysia contributes about 14% of the approximately 340 million barrel of oil equivalent (boe) of energy used every year. At present more than 2.8 million hectares of land are under oil palm cultivation which generate the biggest biomass volume in Malaysia. Of primary interest, the waste from palm oil mills is utilized on-site to provide energy for the mills as well as excess electricity export to the national grid. There are some 281 palm-oil mills in operation in 1995 with an aggregate installed capacity of around 200 MWe to exclusively meet own demand (captive power). It was estimated that a total of 42 million tons of fresh empty fruit bunches (EFB) were produced in Malaysia annually which translates to around 17 million tons of waste. For low-pressure systems with an assumed conversion rate of 2.5 kg of palm oil waste per kWh, potentially 7,000 GWh could theoretically be generated.

Sector	Quantity (kton/yr)	Potential Annual Generation (GWh)	Potential Capacity (MW)
Rice Mills	424	263	30
Wood Industry	2117	598	68
Palm Oil Mills	17980	3197	365
Bagasse	300	218	25
Total	20881	4276	488
Palm Oil Mill Effluent (POME)	31500	1587	177

Table 1 Energy Potential from Oil Palm Based Biomass/Biogas (PTM, 1999)

Palm oil mill processing also produces palm oil mill effluent (POME) which is treated in tanks and then released into the water table, but could be utilised as a source of biogas. From *(Table 1)*, it is clearly seen that the yearly available biomass in 2000 was 17,980,000 tonnes per annum, with the potential to generate 3,198 GW-hours, with a potential capacity of 365 MW. The mills are estimated to produce 31,500 million m3 of POME per year, with a potential to generate 1,587 GW hours, with a capacity of 177 MW.

With the above scenario, many palm oil mill owners do actually have the potential to generate electricity which can be sold to big energy suppliers like Tenaga Nasional Berhad (TNB). All palm oil mills in Malaysia use palm fibre and shell (by products of oil palm milling) as the boiler fuel to produce steam and

Sample	Heat Value (kJ/kg)	Ash (%)	Volatile Matter (%)	Moisture (%)	Hexane Extraction (%)
Empty Fruit Bunches (EFB)	18,795	4.60	87.04	67.00	11.25
Fibre	19,055	6.10	84.91	37.00	7.60
Shell	20,093	3.00	83.45	12.00	3.26
Palm Kernel Cake	18,884	3.94	88,54	0.28	9.35
Nut	24,545	4.05	84.03	15.46	4.43
Crude Palm Oil	39,360	0.91	1.07	1.07	95.84
Kernel Oil	38,025	0.79	0.02	0.02	95.06
Liquor from (EFB)	20,748	11.63	78.50	88.75	3.85
Palm Oil Mill Effluent (POME)	16,992	15.20	77.09	93.00	12.55
Trunk	17,471	3.39	86.73	76.00	0.80
Petiole	15,719	3.37	85.10	71.00	0.62
Root	15,548	5.92	86.30	36.00	0.2

Table 2 Energy Database for Palm Biomass (PTM, 1999)

electricity for palm oil production processes. Such biomass fuel can supply enough electricity to meet the energy demand of a palm oil mill. It is estimated that in year 2004 about 1400 million kWh of electricity was generated and consumed by the palm oil mills (Ma and Yusof, 2005). However, the mills generally have excess fibre and shell, which are not used and are disposed off as wastes. In other words, the palm oil mills still have excess capacity to potentially produce additional renewable energy. Apart from palm fibre and shell, EFB provide considerable source of biomass which can be readily converted into energy. The energy data analyzed for various palm biomass is shown in *(Table 2)*. The data provides useful information for the utilization of palm biomass as boiler fuels.

No.	Type	Energy Resources	Approved Application	Grid Connected Capacity (MW)	%
1.	Biomass	Empty Fruit Bunches	25	165.9	52.8
		Wood Residue	1	6.6	2.1
		Rice Husk	2	12	3.8
		Municipal Solid Waste	1	5	1.6
		Mix Fuel	3	19.2	6.1
2.	Landfill Gas		5	10	3.2
3.	Mini-hydro		25	95.4	30.4
4.	Wind and Solar		0	0	0
	Total		62	314.1	100

Table 3. Status of SREP Projects Approved by Score as of September 2004 (Ludin et al, 2004).

The launch of the Small Renewable Energy Power Programme (SREP) in May 2001, an initiative of the special Committee on Renewable Energy (SCORE) under the Ministry of Energy , Communication and Multimedia (MECM), " kick started" the Government's policy implementation to encourage and intensify the utilization of RE in power generation. SREP's primary objective is to facilitate the expeditious implementation of grid – connected renewable energy resources-based small power plants (Husain and Alimat, 1999).Under this scheme, license is issued to generate and sell energy for 21 years and maximum power allowable for export is 10 MW and with added tax benefits. The status of SREP projects approved by score as of September 2004 by the Malaysian Government is shown in *(Table 3)*.

One of these projects is a 5.2 MW power plant at Pantai Remis Palm Oil Mill, Perak , EFB as fuel. It is connected to the national grid to supply power to a small town located a few kilometers from the station and export electricity to TNB at the rate of US$ 0.043 per kWh (Husain et al, 2003; Jamari, 2002; Nicholas, 2002; Zakaria, 2002). Pusat Tenaga Malaysia (PTM) or Malaysia Energy Centre has been given the mandate to spearhead the implementation of the Biomass Power Generation and Cogeneration in the Malaysian Palm Oil Industry (BIOGEN) project under the helm of the Ministry of Energy, Communication and Multimedia (MECM) in 2003. The project is jointly funded by the Government too repetitive, United Nations Development Programme (UNDP),

Global Environment Facility (GEF) and the Malaysian private sector. The main objectives are to reduce the growth rate of green house gases (GHG) emissions from fossil fuel fired combustion processes. It is envisaged that at the end of the project implementation, GHG emission from power generation in Malaysia is reduced by 3.8%. This reduction could be made possible through fuel substitution as a result of the expected increase in installed capacity from RE power generation. The project also aims to remove some impending barriers that have been hampering RE power project development through strengthening of technical, financial and policy frameworks (PTM, 2003).

The Federal Land Development Authority (FELDA) is another Malaysian government agency that is actively conducting research on use oil palm waste to produce substitute fuel for diesel. The agency has completed building a biomass power plant in Lahad Datu, Sabah, East Malaysia and plans to build 10 more in Peninsular Malaysia. It will spend about USD 1 million for each plant once it receives an approval from the Energy Commission, Malaysia (Abas, 2005). Pusat Tenaga Malaysia (PTM) or Malaysia Energy Centre has been given the mandate to spearhead the implementation of the Biomass Power Generation and Cogeneration in the Malaysian Palm Oil Industry (BIOGEN) project under the helm of the Ministry of Energy, Communication and Multimedia (MECM) in 2003. The project is jointly funded by the Government too repetitive, United Nations Development Programme (UNDP),

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Biogas Production from POME

Besides solid residues, palm oil mills also generate large quantities of liquid waste in the form of palm oil mill effluent (POME), which, due to its high biochemical oxygen demand (BOD), is required by law to be treated to acceptable levels before it can be discharged into watercourses or onto land. In a conventional palm oil mill, about 0.7 m3 of POME is generated for every tonne of FFB processed. Anaerobic process is adopted by the palm oil mills to treat their POME the biogas produced during the decomposition is a valuable energy source. It contains about 60-70 per cent methane, 30-40% carbon dioxide and trace amount of hydrogen sulphide (Ma et al., 1999; Quah and Gillies, 1981). Its fuel properties are shown in *(Table 4)* together with other gaseous fuels.

	Biogas	Natural Gas	LPG
Gross calorific value (MJ/Nm^3)	19.85 - 25.75	3.79	100.48
Specific gravity	0.847–	0.584	1.5
Ignition Temperature (°C)	1.002	650 - 750	450 - 500
Inflammable limits (%)	650 - 750	5 - 15	2 - 10
Combustion air required (m^3/m^3)	7.5 - 21	9.6	13.8
	9.6		

All gases evaluated at 15.5oC, atmosphere pressure and saturated with water vapour.
LPG - Liquefied petroleum gas.
Source : Quah and Gillies (1981).

Table 4 Some properties of gaseous fuels

Year	Palm Oil Production (Million Tonnes)	POME (million m^3)	Biogas (million m^3)	Electricity (million KWh)
1997	9.07	32	896	1613
2004	13.98	49	1372	2470

Source: Ma and Yusof (2005)

Table 5 Potential energy from biogas

It was estimated that one cubic meter of biogas is equivalent to 0.65 litre of diesel for electricity generation. Hence the total biogas energy can substitute 582 million litres of diesel in 1997. This amounted to RM378 million. Again the amount of biogas generated by an individual palm oil mill is not significant for commercial exploitation. However, the economic viability may be attractive if palm oil mills can utilise all the fibre, shell EFB, and biogas for steam and electricity generation. So far, only a few oil mills harness the biogas for heat and electricity generation (Quah and Gillies, 1981; Quah et al., 1982; Gillies and Quah, 1984; Chua and Gian, 1986). The potential energy from biogas generated by POME is shown in *(Table 5)*. A successful example of closed tank anaerobic digester system for POME biogas capture and utilization is Keck Seng (Malaysia) Berhad.The system has been in continuous operation for over 19 years practically without any interruptions. The company has been awarded the ASEAN Energy Award 2003 for the Off-Grid category in New Renewable Source of Energy Project Competition.

Biodiesel as RE in Malaysia

The government has announced the introduction of a National Biofuel Policy on 10 August, 2005. The policy is primarily aimed at reducing the country fuel import bill, promoting further the demand for palm oil which will be the primary commodity for biofuel production (alongside regular diesel), as well as to shore up the price of palm oil especially during periods of low export demand. Palm oil based methyl ester has been studied thoroughly as a diesel substitute in Malaysia (Mukti et al, 1984; Ong et al, 1985; Azhar et al, 1989; Masjuki and Sohif, 1991; Masjuki et al, 1993; Choo et al, 1995; Choo and Ma, 2000; Ali and Tan, 2005). Crude palm oil, crude palm stearin and crude palm kernel oil can be readily converted to their methyl esters. Ho et al (2005) proposed the application of immobilized lipase as an enzymatic catalytic tooptimize the transestrification process. They claimed that this process could lower the production cost of biodiesel.

The production by PORIM/PETRONAS patented technology (Choo and Ma, 2000; Ong et al., 1989) has been adequately described (Ma et al., 1993). Methyl esters from crude palm oil and crude palm stearin produced by PORIM/PETRONAS technology have very similar fuel properties as the petroleum diesel *(Table 6)*. It also has a higher cetane number than diesel *(Table 7)*. It can be used directly as fuel in unmodified diesel engines.

As an initial step to commercialize biodiesel in Malaysia, two biodiesel plants will be built at Port Klang, Selangor and Pasir Gudang, Johor, respectively. The project is a co-operation between Malaysian Palm Oil Board (MPOB) and three selected palm oil manufacturers. Each plant is estimated to have biodiesel production capacity of 60,000 metric ton.

Property	Malaysian diesel	Methyl esters from CPO	Methyl esters from CPS	Palm diesel with low pour point
Specific gravity ASTM D 1298	0.8330 at 15.5°C	0.8700 at 23.6 °C	0.871 at 25.5 °C	0.8803 at 15.5 °C
Sulphur content (% wt) IP 242	0.10	0.04	0.02	<0.04
Viscosity at 40°C (cSt) ASTM D 445	4.0	4.5	4.6	4.5
Pour Point (°C) ASTM D 97	15.0	16.0	17.0	-15.0
Distillation D 86 (°C)				
I.B.P	228.0	324.0	320.2	N/A
10%	258.0	330.0	331.0	
20%	270.0	331.0	332.0	
50%	298.0	334.0	335.0	
90%	376.0	343.0	343.0	
F.B.P.	400.0	363.0	349.0	
Final recovery (%)	N/A	98.0	98.5	N/A
Cetane Index ASTM D 976	53	50	52	N/A
Gross heat of combustion (kJ/kg) ASTM D 2382	45, 800	40, 135	39, 826	39,160
Flash point (°C) ASTM D 93	98	174	165	153
Condrason carbon residue (% wt.) ASTM D 189	0.14	0.02	0.05	0.01

Sources: Ma and Yusof (2005).

Table 6 Fuel characteristics of Malaysian diesel, methyl esters from crude palm oil (CPO), methyl esters from crude palm stearin (CPS) and palm diesel with low pour point

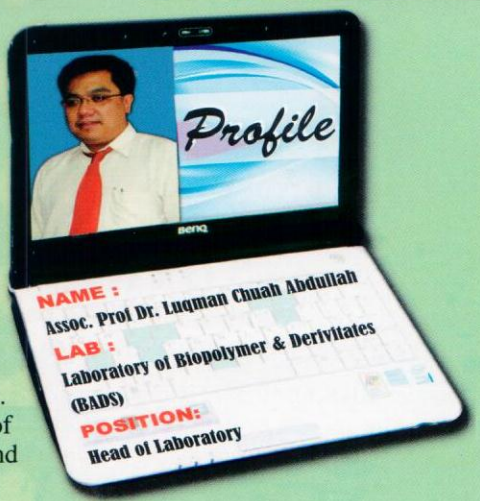
Blends		Cetane number ASTM D613
CPO methyl esters (%)	Petroleum diesel (%)	
100	0	62.4
0	100	37.7
5	95	39.2
10	90	40.3
15	85	42.3
20	80	44.3
30	70	47.4
40	60	50.0
50	50	52.0
70	30	57.1

Sources: Ma and Yusof (2005).

Table 7 Cetane numbers of crude palm oil methyl esters, petroleum diesel and their blends

Conclusions

In the 8th Malaysia Plan, renewable energy is considered the fifth fuel in addition to petroleum, gas, coal and hydro. However, Malaysian energy supply is still mainly sourced from fossil fuels. The progressive escalation of fuel price in recent times has led to an intensive study in using renewable energy. Oil palm based biomass is the most potential source of renewable energy in Malaysia. Residues obtained from the harvesting and milling of the oil palm plantation can be utilised as fuel for energy generation. Palm oil industry is bestowed with huge supply of by-products that can be readily used as energy source with ease. Efforts are being made to connect the excess energy supply in the form of electricity from the palm oil mills to National Grid. Besides, Malaysia is also strongly promoting the use of palm diesel as replacement of fossil fuel. Currently, biofuel policy framework has been drafted by the government and will soon be implemented in the country to encourage the uses of biofuels.



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Training on Ultra Nano Homogenizer & Training on Digital Image Analyzer

Date : 13 & 14 January 2011
Venue : INTROP Tech,UPM

The Material Characterization & Analysis Unit under BIOCOMPOSITE laboratory had organized two separate training session on Ultra Nano Homogenizer (13 January 2011) and Digital Image Analyzer (14 March 2011). Purchased nearly a year before the training, the Ultra Nano Homogenizer equipment was used during the training to enhance skills and faster a more precautious approach to avoid damage to the equipment and enhance safety for users.

The Digital Image Analyzer equipment was purchased much earlier before the establishment of INTROP it is however still in its best shape. This training familiarised the users with the new software in particular on better handling interface. Representatives from Matrix Optic Sdn. Bhd. Conducted the training on the new software including hands on operational training for new students who will be using the equipments.

Training on Internal Mixer

Date : 26 January 2011
Venue : Introp Tech, UPM

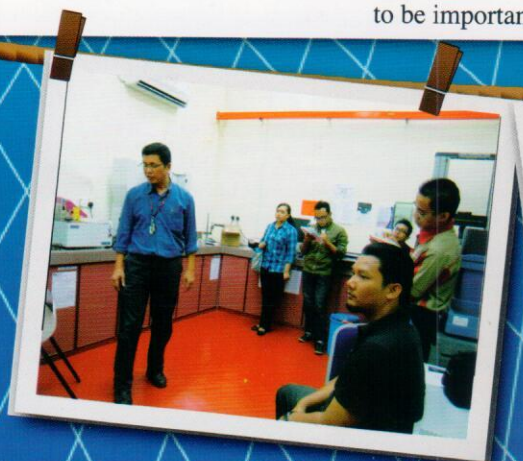
On 26 & 27 of January 2011, BIOCOMPOSITE Laboratory had organized training on used of a new equipment known generally as the Internal Screw Mixer or more popularly as the Plastograph EC. It is manufactured by BRBENDER, which is based in Duisburg,Germany. The equipment was purchased to assist students in polymer research in INTROP. The hands-on training was conducted by Melchers which is the sole representative of BRABENDER in Malaysia and attended by all staff in the BIOCOMPOSITE laboratory.

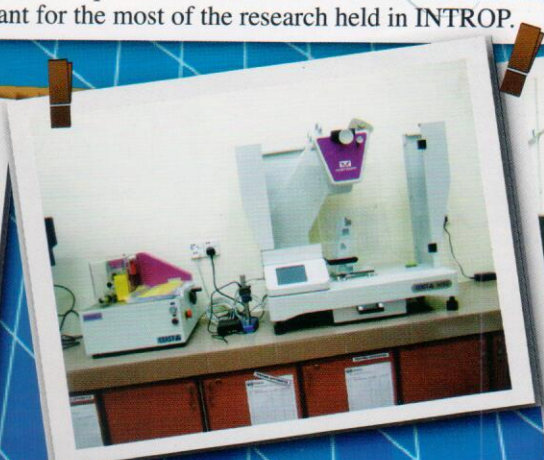
Training on Impactor & Hardness Tester and Training on Single Fibre Jig.

Date: 27 January 2011 Venue : INTROP Tech, UPM

Material Testing Unit under the BIOCOMPOSITE laboratory had managed to add on two (2) new equipments which is the Impactor II (Pendulum type) and the Wilport Wilson Rockwell Hardness Tester from CEAST, Torino, Italy. CEAST is a partner to INSTRON (famous in mechanical testing equipment) that involves in the manufacturing of testing equipment ranging from the determination of impact and technology on feeding system using gravimetric feeder system.

A new jig for single fibre tensile determination was also purchased from INSTRON for another range of testing that is considerable to be important for the most of the research held in INTROP.





Introp Research Colloquium 2010

Date: 13 December 2010
Venue : Pullman Putrajaya, Lakeside Hotel

On the 13th of December 2010, INTROP has organized INTROP Research Colloquium 2010 held at Pullman Putrajaya, Lakeside Hotel. Its main objective was to provide an intellectual platform for researchers and opportunities in improving the implementation of current project progress. INTROP compiled all projects output which are operated throughout the years. It is a hope the colloquium will be the platform to further improve the researchers output. Besides, for those projects which are almost completed may took the opportunity in commercializing their products. Enormous collaboration with local and international agencies had buoyed INTROP, tuning in these 3 days colloquium a perfect platform for researchers to present, discuss and exhibit their work. There were 36 oral presenters, 20 posters presenters and 80 participants from various agencies and research background attended the colloquium. Last day was the most important session where a concept paper involving three new potential projects were presented. These project were believed to enhance the existing foundation on the kenaf research, developments and commercialization at national and international level.

International Natural Fiber Organization (INFO)

Date : 16 – 18 March 2011
Venue: Palm Garden, Putrajaya

There are 2 main events organized in relation to the collaboration between International Natural Fiber Organization (INFO) and Institute of Tropical Forestry and Forest Products (INTROP), UPM. The Foresight Workshop was held in Palm Garden Hotel, Putrajaya on 16-17 Mac 2011. Thirty participants from Brazil, Bangladesh, Filipina, India, Sri Lanka, Tanzania Netherlands and United Kingdom participated in the workshop. Malaysian representatives came from National Kenaf & Tobacco Board (NKTB), Malaysia Industry-Government High Technology (MIGHT), Sri Jentayu Sdn. Bhd. and MyKenaf Association.

INFO was officiated by Dr. Jalaluddin Harun, Director General of Malaysian Timber Industry Board (MTIB). He hoped that through this workshop may increase collaboration in the form of exchanging ideas and technologies focusly in the industry of natural fibre. This platform is also targeted to initiate the development of new and high quality products at global market.

Parallel to the workshop was Forum 2020 entitled 'Moving towards the Commercialisation of Green Composites for High Technology Applications' which was held at Briefing Hall, UPM on 18 March 2011. This forum was organized by Persatuan Industri Komposit Kuala Lumpur and Selangor (PIK) and INTROP, role as co-organizer. This forum attracted more than one hundred participants from various government and private agencies. Mr. Habibur Rahman, the President of PIK delivered the Welcoming Speech at the opening session of the forum. Representative from National Kenaf and Tobacco Board (NKTB), Malaysian Palm Oil Board (MPOB), East Coast Economic Region Development Council (ECERDC) and MyKenaf Association also the presented panel members shared their latest and uprising views that day.

Convention on Biological Diversity (CBD) DIALOGUE

Date: 22 February 2011
Venue: Senate Hall, UPM

The Convention on Biological Diversity (CBD),is one of the three issues in "Rio Conventions", emerged from the United Nation Conference on Environment and Development, also known as the Earth Summit. This roundtable dialogue held at the Senate Hall, UPM organized by INTROP gathered relevant and respective member in Malaysia. The objectives of this dialogue were to share the commitment in achieving reduction in biodiversity loss, providing a platform of knowledge sharing on CBD programs and activities. Finally this dialogue aimed to collaborate any suitable research works and activities. The member of the Convention committed themselves to achieve their targets, by 2010. A significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation is aimed.

This target was subsequently endorsed by the World Summit on Sustainable Development (the 'Rio + 10' summit) in Johannesburg, 2002, followed by the United Nations General Assembly. It was also incorporated as a new target under one of the Millennium Development Goals – Ensure Environmental Sustainability. Commitments from all governments and private agencies whom related either directly or indirectly with 2010 Biodiversity Target were needed.

UPM Postgraduate Education Fair 2011

Date: 25-27hb March 2011
Venue: PKKSSAAS UPM

"UPM is one of Malaysia's top research universities with internationally accredited degrees; an ideal place for education and training for both local and foreign students" was the tagline for UPM Postgraduate Education Fair held on the 25-27 March 2011. The main objective of this year as an ideal place for education and training either for local or foreign students. This fair is also held in order to enrol new post graduate students for Semester 1 & 2, 2011-2012. During the fair students were introduced to INTROP's background, field of studies and research areas. For those who were interested pursuing their studies were given the opportunities to free-register on that day.

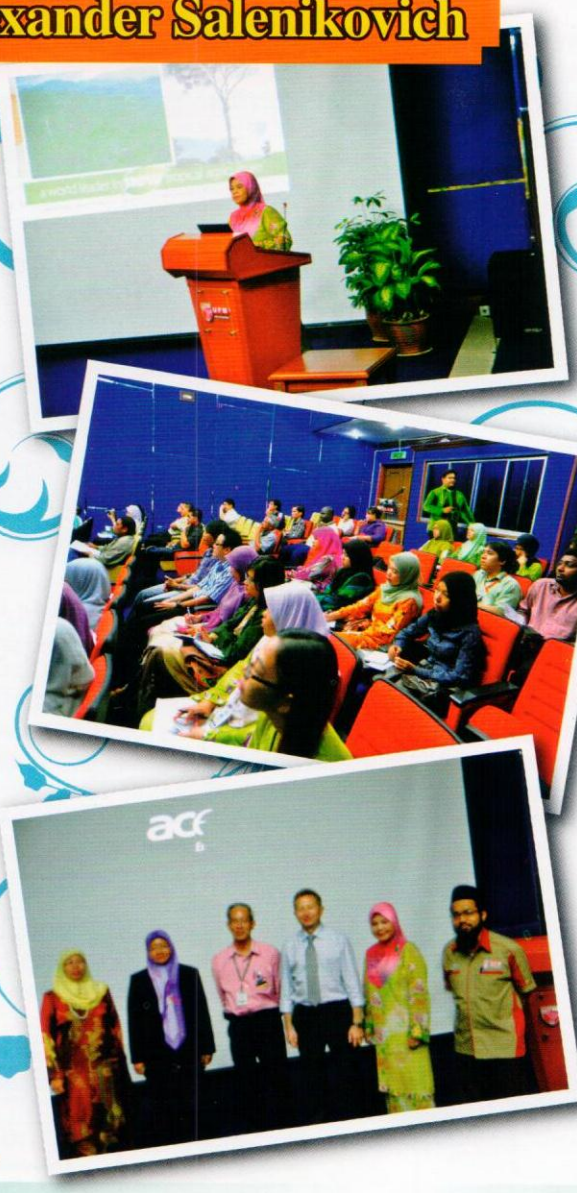
Public Talk Assoc. Prof. Dr. Alexander Salenikovich

Date: 27 April 2011

Venue: Briefing Hall, UPM

The Institute of Tropical Forestry and Forest Products (INTROP), Universiti Putra Malaysia has successfully organized a Public Talk Series on Engineered Wood in Malaysia: Standard, Design and Applications on 27th April 2011 at the Briefing Hall, Administrative Building, Universiti Putra Malaysia. The guest of honour was Assoc. Prof. Dr. Alexander Salenikovich from Department of Wood and Forest Sciences, University of Laval, Canada, a specialist in engineered wood and test method for timber. He is the Associate Professor of Timber Engineering and member of the Wood Research Centre at the Department of Wood and Forest Sciences University of Laval. His research is focused on design methods for mechanical connections for timber structures and furniture, improvement of prefabricated housing systems, development of wood engineered composites, high-wind and seismic design of wood-frame structures and development of testing procedures. He teaches design of timber structures, mechanical properties of wood, and test methods.

Professor Salenikovich is the vice-chairman of the ASTM committee on Wood Construction, an expert member of the Canadian Advisory Committee of ISO/TC 218 on Timber, a voting member of the CSA Standards TC O86 on Design of Timber Structures and A370 on Solid and Engineered Wood Products, member of the Society of Wood Science and Technology and the Forest Products Society, and a registered member of the Ordre des ingénieurs du Québec.



Title of the talk was 'Engineered Wood Products: Manufacturing, Testing and Structural Applications'. The seminar also included lectures from Assoc. Prof. Dr. Paridah Md Tahir on "Overview of Malaysian Timber Industry", Assoc. Prof. Dr Zakiah Ahmad on "Malaysian Standards for Engineered Wood" and Assoc. Prof. Dr. Hjh. Rahinah Ibrahim on "Development of Timber Industrialized Building System (IBS) Design Guide". The program attracted more than 80 participants including academicians and industry representatives. The seminar covered a wide range of modern products available commercially for construction in North America, such as glued-laminated timber (glulam), wood I-joists and structural composite lumber (LVL, PSL, LSL and OSL). Recent developments, such as laminated veneer bamboo lumber (LVBL) and cross-laminated timber (X-lam) were introduced. Existing standard procedures employed for quality control and qualification testing including durability and high temperature resistance issues were discussed. Most notable examples of recent construction projects were illustrated to provide information for the participant on latest development and innovation on Engineered Wood Products especially for structural applications.

Safety in Office

The office is a room or building used as place of business for non-manual work. Since, every day we are in the office to do daily offices work. We should therefore give priority to our safety.

Office Accidents

Most of office accidents resulted from slip, trips and fall, lifting objects, punctures or cuts and being caught in or between things. Slips are caused by slippery floors, uncleaned spillages or gripless shoes. Trips occur over objects lying on the ground or jutting out into aisles or because of poorly maintained floor surfaces. Falls can be from ladders or from standing on chairs to reach an object.

These accidents can be avoided with a good planning and housekeeping.

* Traffic ways and aisles should be well lit, and must be kept clear of material, equipment, rubbish and electric leads.
* Floor should be level and the use of mats discouraged. Spilled liquids and anything else dropped on the floor should be immediately picked up or cleaned.
* Free standing fittings should be completely stable or secured to the wall or floor. Filing cabinets should be placed so that they do not open in to aisles and should never be left with cabinets drawers open. For stability load cabinets starting from the bottom and do not open more than one drawer at a time.
* Office machine and equipment should be kept in good working order. Equipment using hand-fed process such as electric staplers and paper guillotines should be guarded and staff trained in their proper use.
* Many pieces of equipment using electricity can mean trailing cables, overloaded circuits, broken plugs and sockets. Ensure that these dangers are seen to by qualified personnel.

Manual Handling

Manual handling is a term used to describe everyday type activities such as carrying, stacking, pushing, pulling, rolling, sliding, lifting or lowering loads. For office workers this can include task such as moving boxes of stores, filing, setting equipment from cupboards and filling the photocopying machine with paper.

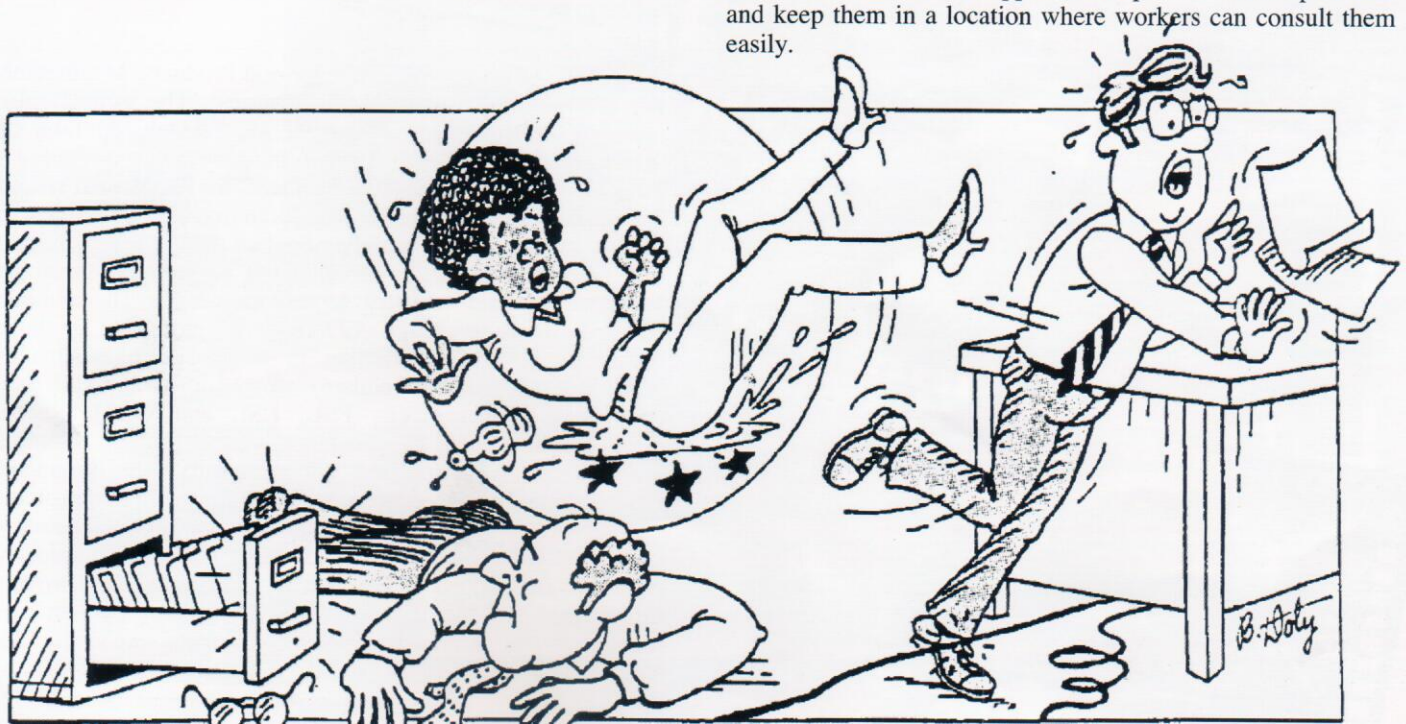
A common office hazard is the manual movement of loads leading to back injuries and pain in hand, wrist and neck. To reduce the likelihood of these types of accidents the requirements are;

* Remove the need for manual handling that could be the cause of injury,
* Identify those tasks where manual handling cannot be avoided and assess the risk of injury,
* Reduce the risk of injury by rearranging the work being done (e.g. have paper delivered to photocopier by hand truck rather than manually carrying it from stores, reduce weight to be lifted, etc.)
* Provided manual handling training to workers who need it (messengers, service attendants etc.) and give them information on the weights being **lifted and how to plan a lift.**

If cabinets, desks or other heavy office equipment have to be moved, do take particular precautions which would include providing hand truck or trollies and using team lifting. More details, please refer to Guidelines on Manual Handling.

Chemical

Small quantities of chemical are used in the office and include printing inks, photocopier toners, cleaning chemicals and correction fluids. Ensure office workers are aware of their hazards. These hazards together with the appropriate safeguards are normally detailed in the material safety data sheets (available from supplier). Keep these sheet up-to-date and keep them in a location where workers can consult them easily.

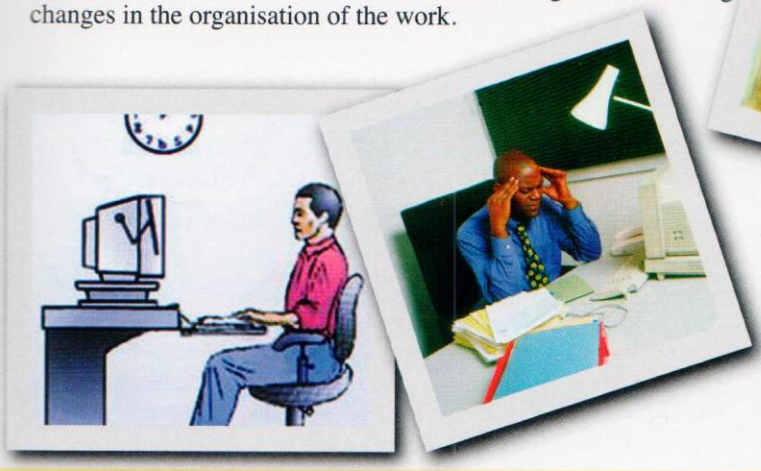


Emergencies

The type of emergencies that could occur in the office include fires, gas leaks and lift failure. To ensure an orderly evacuation from the office an emergency plan should be prepared and tested on a regular basis. The plan should cover fire drills/safe evacuation, how to shut off machine and leave the workplace safe, name persons who are responsible for the evacuation and calling the emergency services, and detail the assembly areas. The emergency plan can be part of a safe work procedure.

Stress

Workplace stress is of increasing concern in offices and is still poorly understood. Stress arises when the demands on the worker exceed the capacity to cope. Stressful situations should be identified in the office and safeguards must be implemented at organisational level to minimise the risk. This might mean making changes in the organisation of the work.



Work Equipment

Equipment used in the office (e.g. paper shredders, photocopiers, faxmachines, printing machines) should be used in accordance with suppliers instructions and should be kept in good condition at all time, be repaired or serviced by qualified persons and any defects reported to the office manager.

MANAGING YOUR TIME

Effective time management will help get more done each day. It has important health benefits. By managing your time more wisely, you can minimize stress and improve your quality of life.You can choose these strategies to try and pratice for two to four weeks and find out if it could help.

Plan each day

Planning your day - help you accomplish more and feel more in control of your life. Keep a schedule of your daily activities to minimize conflicts and last-minute rushes.
To-do list, putting the most important tasks at the top.

Prioritize your tasks

Time-consuming but relatively unimportant tasks can consume a lot of your day. Prioritizing tasks will ensure that you spend your time and energy on those that are truly important to you. Set goals for both the short term and long term as to what you want to accomplish.

Say no to nonessential tasks

Consider your goals and schedule before agreeing to take on additional work.

Delegate

Take a look at your to-do list and consider what you can pass on to someone else.

Take the time you need to do a quality job

Doing work right the first time may take more time upfront, but errors usually result in time spent making corrections, which takes more time overall.

Break large, time-consuming tasks into smaller tasks

Work on them a few minutes at a time until you get them all done.

Practice the 10-minute rule

Work on a dreaded task for 10 minutes each day. Once you get started, you may find you can finish it.

Get plenty of sleep, have a healthy diet and exercise regularly

A healthy lifestyle can improve your focus and concentration, which will help improve your efficiency so that you can complete your work in less time.

Take a break when needed

Too much stress can derail your attempts at getting organized. When you need a break, take one. Take a walk. Do some quick stretches at your workstation. Take a day of vacation to rest and re-energize.

Have a Vision (why are you doing all this?)

* Don't forget the "big picture" - why are you doing the task - is it important to your long-term personal goals?
* Have and follow a personal mission statement (personal and career). (Are your activities ultimately helping you achieve your goals?)
* Know what is important to you. (What do you value most?)
* Have a positive attitude!

Keys to Successful Time Management

* Self knowledge and goals: In order to manage your time successfully, having an awareness of what your goals are will assist you in prioritizing your activities.
* Developing and maintaining a personal, flexible schedule: Time management provides you with the opportunity to create a schedule that works for you, not for others. This personal attention gives you the flexibility to include the things that are most important to you.

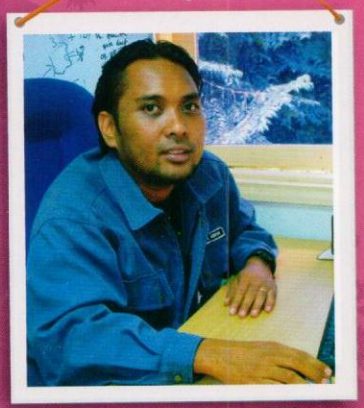
REFERENCE

http://www.mayoclinic.com/health/time-management/wl00048

http://www.dartmouth.edu/~acskills/success/time.html

http://www.cob.sjsu.edu/nellen_a/time_management.htm

INTROP : New Members



Dr. Mohd Khairun Anwar b. Hj Uyup
mkanwar@putra.upm.edu.my
mkanwar@frim.gov.my

Field of Specializations :
Wood modification and non-wood forest products

Achievements :
a) IUFRO World Congress- Seoul, Republic of Korea- Scientist Assistance Program Award 2010
b) Incentive for Publication in Journal with impact factor 2010
c) First Place (2008)- FRIM Publication Award- Category B: Semi Technical.
d) APAFRI- Colombia, Sri Lanka- Scientist Assistance Program Award- 2009
e) Incentive for Publication in Journal with impact factor 2009
f) FRIM Best Research Award 2009- Phenolic-treated plybamboo.
g) Best E-science Award 2009. Development of exterior grade plybamboo.
h) IUFRO All Division 5 Conference, Taipei - Scientist Assistance Program Award- 2007

What is your opinion of INTROP's working environment?
INTROP has a very good and conducive working environment in addition to the staff who are always cooperative towards achieving a set target. The working system is almost similar, but working in a new environment makes it a ittle difference and this makes it the more interesting.

How does you see INTROP 5 years onwards?
I foresee in the next 5 years, INTROP may be able to be at par with other research institutions involved in tropical forests research and development. The continuous up-grading program of research facilities will further alleviate INTROP into a Center of Excellence. However, the shortage of quality manpower and experienced researchers must be immediately addressed and overcome by increasing the number of research officers. This will ensure that R&D activities will not be delayed, as motivated staff will give more impact and would be able to meet the targeted strategic plan.

Recent projects
- PTP-2: A simple process
- Macroscopic and microscopic fluid migration on tropical woods
- Enhancement of selected plantation species by chemical modification for architectural applications

What was your feeling when joining INTROP?
I was very excited to be given the opportunity to work in a new environment like INTROP's although for a short period. I would like to convey my sincere thanks and appreciation to AP Dr Paridah Md Tahir and UPM for accepting me as a new member of INTROP. Not forgetting FRIM especially the DG for his support and allowing me to gain new experience there. It is an excellent opportunity for me to improve my knowledge, share information, improve my research skills and production of scientific papers.

What is your strategy for the future as Post-Doc in INTROP?
I will try my best to help my supervisor in the preparation of new proposals for research grants applications. At the same time produce scientific papers for publication in journals with impact factor as well as conducting research that has been planned.

Dr. Mahnaz M.Abdi
mahnaz131@gmail.com

Field of Specializations :
Material chemistry, Conducting polymers, Electrochemistry

Achievements in International Level :
Scientific member of NanoTechnology Scientific Core (NTSC)

Recent Project :
Preparation and characterization of Bio-nanocomposite, Biosensor Based on Nanocomposite of conducting polymer

What was your feeling when joining INTROP?
Interviewer the achieved success in my Ph.D project, high reputation of UPM and availability of such an attractive Post Doc position in Biopolymer technology at INTROP, made me feel that it is a big honor if I get an opportunity to start my research with this group. At the beginning, I honestly felt that I'm not belong here but after a while I found the INTROP's staff quite friendly and I am grateful to them for helping me feel at home here. I would like to take this opportunity to express my sincerest appreciation to Assoc. Prof. Dr. Luqman Chuah Abdullah and Assoc. Prof. Dr. Paridah Md Tahir for giving me the opportunity to work in their group in INTROP

What is your strategy for the future as Post- Doc in INTROP?
I believe that the post-doctoral fellowship is a critical period for refining experimental skills acquired in the doctoral program, applying these skills and knowledge to a new area of research, and learning new skills essential for obtaining independent funding and publication of experimental findings. In these regards, I can devote 100% of my time to research and therefore are able to submit more journal articles based on my PhD, and possibly collect data to be used in future publications. In addition, I think I have also more time to gain new technical and research skills, extend the research undertaken during my PhD or gain expertise in a completely new area, and make a name for myself in academic circles before looking for long-term academic positions after the post-doc.

What is your opinion of INTROP's Working environement?
I found INTROP more friendly and a quiet place for research and study.

How do you see INTROP 5 years onwards?
I see INTROP accumulating than today. I believe that if INTROP performs with excellence, future opportunities will take care for themselves. I predict that if INTROP can attract more excellence researchers and talented students who work on new research areas the agency can be promoted into the top research institutes in Malaysia within 5 years.

Introp's Visitor

May 18 2011

DELFORTGROUP AG

Visitor : Mr. Otto Pichler Senior Manager Strategic Projects

Objective : To enhance networking and research collaboration on Pulp & Paper.

Contact : Delfortgroup AG
Fabrikstrasse 20/A-4050 Traun
T+43(0)7229 776-598
F+43(0)7229-312
M+43(0)66488505435
Otto.pichler@delfortgroup.com
www.delfortgroup.com

May 18 2011

DELFORTGROUP AG

Visitor : Mr. Hock Song Lim Head of Corporate Development

Objective : To enhance networking and research collaboration on Pulp & Paper.

Contact : c/o Mountain Dragon International (HK) Ltd. Suite 1227/12thFloor/Ocean Centre Harbour City/Canton Road Tsim Sha Tsui/Kowloon / Hong Kong
T+85227307187 F+85227367771
M+85290969360
M+43(0)66488505425
Hocksong.lim@delfortgroup.com
www.delfortgroup.com

May 19 2011

UNIVERSITY Of Nancy 1, Epinal, France, 1995

Visitor : **Prof. Dr. Anthonio (Tony) Pizzi**

Objective : To enhance networking and research collaboration on Biocomposites & Pulp & Paper

Contact : ENSTIB, Université Henri Poincaré, BP 1041, F-88051 Epinal cedex 9 France

March 16-18 2011

Sekolah Seri Puteri, Cyberjaya Boarding School

Visitor : **Teacher and students**

Objective : Preparation for Science Competition

18 Feb 2011

INSTRON CEAST-Torino Italy

Visitor : Scaffone Fabrizio

Objective : Technical Visit

18 Feb 2011

INSTRON SINGAPORE

Visitor : Michele Ivory

Objective : Technical Visit

21 March 2011

Secretary General, IJSG Dhaka, Bangladesh Technical Visit

Visitor : Bhupendra Singh

Objective : Technical Visit

26-27 April 2011

Canada Public Talk Speaker

Visitor : Alexander Salemicovich

Objective : Québec (Québec) G1V 0A6 CanadaPublic Talk Speaker

Contact : Université Laval 2325, rue de l'Université Québec (Québec) G1V 0A6