MPOB News

MPOB again left its mark in the international arena when it won two gold medals and a silver medal at the 30th International Exhibition of Inventions and Innovations held at Geneva from 1-5 May. The innovation by Drs Ravigadevi Sambanthamurthi, Kalyana Sundram and Tan Yew Ai entitled Production and Commercialization of Flavonoid-phenolic Antioxidants from Palm Oil Mill Effluent (POME) bagged a gold medal. This innovation was judged overall winner at the Inventions and Innovations Competition held in conjunction with the Malaysian Expo Science 2001. The innovation was also nominated by the Far Eastern Economic Review for the Asian Innovation Awards and was one of the finalists despite stiff competition from major corporations such as Sony. The technology was launched last year at MPOB’s Transfer of Technology (TOT) seminar and has been taken up by a commercial company.

The three scientists who developed the technology have demonstrated that POME is a very rich source of water-soluble antioxidants, especially flavonoid-phenolic compounds. They have also gone on to confirm that the filtrate produced from the process developed has potent protective function against cancer and atherosclerosis.

The next gold medal went to Drs Siew Wai Lin and Cheah Kien Yoo for their innovation entitled M-Olein-A Palm Oil Product with High Monounsaturation. This innovation also won a gold medal at the Inventions and Innovations Competition, Expo Science 2001. The two scientists developed a process for producing novel palm olein using purely palm oil products. This palm olein called M-olein is the only palm olein having oleic acid content higher than 60%. A typical value is 65%. The inventive steps involved interesterifying palm olein with palm fatty ester under carefully controlled conditions. When neutralized palm olein is used, M-olein and stearin with high natural carotenoids are obtained. The process is versatile, producing multiple products that can be used in the food and non-edible oil industry.

The silver medal went to the innovation on Continuous Sterilization of Fresh Fruit Bunches. This was the effort of Dr Sivasoathy Kandiah, Rohaya Mohamad Halim, Datuk Dr Yusof Basiron, Zulkifli Abdul Rahman and Dr Ma Ah Ngan. This innovation which has already been tested at the pilot scale won a gold medal at Innotex 2002 organized by the Malaysian Invention and Design Society (MINDS). The process involves disrupting the tight arrangement of fruits in a bunch in order to facilitate penetration of steam into the inner layers of the bunch. This is achieved using a double-roll crusher. The bunches are heated immediately after they are crushed while they are conveyed continuously and progressively through the sterilizer chamber. This pre-heating deactivates lipases and also facilitates deaeration and minimizes the amount of air entering the continuous sterilization chamber thus ensuring that the temperature in the continuous sterilization chamber is close to that of saturated steam.

The study confirmed that there should be no major problems integrating the continuous sterilization process with the rest of the milling process in a conventional palm oil mill. The FFA contents of oil samples from continuous and batch sterilization processes were also similar.

Continuous sterilization offers the following advantages:

- eliminates the use of sterilizer cages, rail tracks, overhead cranes, tippers, transfer carriages and tractors;
- renders the entire palm oil milling process a continuous operation that can be easily automated to make it less labour intensive;
- the sterilization steam demand will remain approximately constant, thereby minimizing fluctuations in the steam pressure and electrical voltage and frequency. Such fluctuations would normally lead to problems such as higher product losses, poor product quality and reduced throughput;
- minimizes or eliminates the need for manual firing of the boiler to cope with fluctuations in the steam pressure, thereby improving boiler efficiency and reducing black smoke emission from the boiler stack;
- minimizes spillage of fruitlets and oil, thereby contributing towards making the mill cleaner; and
• facilitates the design and construction of small and mobile mills having significantly smaller footprints than conventional mills.

**Innotex 2002**

MPOB reaped two gold medals and a silver medal at this year’s Expo Science and Technology Exhibition (Innotex) organized by MINDS. The project on the Harvesting of Phytonutrients from Palm Oil by Dr Choo Yuen May, Harrison Lau Lik Nang, Puah Chiew Wei, Ng Mei Han, Bong Siow Ching, Dr Ma Ah Ngan and Datuk Dr Yusof Basiron clinched the gold medal as well as the Henry Goh Environmental Innovation Award.

The production of phytonutrients from crude palm oil consists of:

- transesterification of crude palm oil into alkyl esters e.g. methyl esters; and
- distillation of alkyl esters to produce phytonutrient concentrate.

The phytonutrient concentrate that is obtained from molecular distillation is subjected to an integrated process which includes various chemical and physical treatments, supercritical fluid extraction (SFE), supercritical fluid chromatography (SFC) and flash chromatography to produce high purity carotenes, vitamin E, sterols, squalene, co-enzyme Q and phospholipids.

Advantages of the process:

- the integrated process is clean, safe and environmentally friendly;
- palm carotenes, tocoids, squalene, sterols, ubiquinones and phospholipids which are high valued products can be produced simultaneously;
- by-products from the integrated process such as glycerol distilled alkyl esters can be utilized in the oleochemical, cosmetic, pharmaceutical, biofuel and lubricant industries;
- minimal organic solvents are used in the integrated process;
- the supercritical fluid (i.e. supercritical carbon dioxide) used as solvent in the production of these valuable palm oil phytonutrients is non-toxic, non-hazardous, non-inflammable and environmentally friendly. Most importantly, it leaves no solvent residue in the products;
- this process incurs very low operating cost; and
- the harvesting of these phytonutrients from palm oil provides business opportunities for the industries.

The technology headed by Dr Sivasothy Kandiah on continuous sterilization won a gold medal at this exhibition. Dr Ooi Tian Lye and his co-workers - Dr Hazimah Abu Hassan, Norin Zamiah Kassim Shaari, Dr Yeong Shoot Kian and Dr Salmiah Ahmad won the silver medal. The group developed a technology for the Recovery of Glycerol and Other Valuable Chemicals from Glycerol Wastes.

**HIGHLIGHTS OF SEMINARS, CONFERENCES AND COURSES**

**First Industry Workshop: Carbon Finance for the Palm Oil Sector**

This workshop organized by and held at MPOB Headquarters from 25-26 February attracted 102 participants, 63 from industry and 39 from MPOB.

The oil palm industry has unique characteristics that enable its products and by-products to be used as the raw materials for a variety of downstream applications that have substantial environmental benefits. For example, palm oil and its derivatives (palm diesel) can be used as biofuels, which are becoming increasingly important sources for clean energy. Additionally, palm biomass can be used for making paper and pulp, plywood, medium density fibreboard (MDF), etc, as well as developed into renewable energy to displace fossil fuel. Various forms of palm residue can also be converted to energy and other value-added products. These and other applications have been substantively investigated by MPOB and are beginning to evolve into commercial development.

Many of these emerging applications have the further benefit of positive implications on the
net emissions of greenhouse gases. Under the terms of the 1997 Kyoto Protocol - a major international initiative established to reduce the threat of global warming - there is the potential financial gain to actually transact these greenhouse gas benefits to external parties under the Clean Development Mechanism (CDM). Through a series of major international meetings held over the last year in The Hague, Bonn and Marrakech (Morocco), a fully functional CDM with rules and modalities is now being established. Over time, this will provide a liquid market for trading these emission reduction benefits. Already, the emergent market creates opportunities for innovative forms of project finance that help reward and subsidize the path towards greater process sustainability. In 2002, it is expected that between US$ 250 million and US$ 1 billion will be committed to these types of emission transactions.

For the palm oil industry, this new line of financing represents a unique window to implement cutting-edge technologies that will not only benefit both the local and global environment, but will also enhance the income for growers, processors and developers.

The objectives of the workshop were:

- to provide a fuller understanding of the CDM, its rules and modalities, and financial transactions that can be developed through emission reductions in the palm oil industry;
- to identify those specific sectors and technical opportunities in the oil palm industry that are best positioned to achieve carbon financing;
- to give the palm industry the opportunity to engage government and world experts to discuss appropriate policies, incentives and structures for enabling carbon transactions in the Malaysian palm oil sector;
- to examine case studies that demonstrate how carbon transactions have played an integral part of financing projects in other venues; and
- to detail the opportunities and the way forward for members of the industry to achieve carbon finance.

Seminar on Elevating the National Oil Palm Productivity and Recent Progress in the Management of Peat and Ganoderma

MPOB organized this seminar with the main objective of discussing policies and strategies to increase national oil palm productivity in Malaysia. The Honourable Minister of Primary Industries, Y.B. Dato’ Seri Dr Lim Keng Yeik officiated the launching of this seminar which was held at the Equatorial Hotel, Bangi. A total of 375 participants registered for this seminar of whom 327 were from industry and 48 from MPOB. The policies were discussed under three perspectives, i.e government, management and R&D. The seminar also discussed past and current knowledge on the management of oil palm on peat and future R&D strategies. The latest findings from the Ganoderma research by the industry and universities were also discussed.

Oil palm fresh bunch (FFB) and crude palm oil (CPO) production in Malaysia has been relatively stagnant for the past 25 years averaging around 19 t ha\(^{-1}\) and 3.5 t ha\(^{-1}\) respectively. The current decrease in the CPO price in the world market makes it pertinent for the industry to focus on increasing the oil palm productivity through good estate and mill management practices.

Good suitable soils for oil palm planting are now becoming scarce. Use of marginal soils, such as peat, is a way out of this problem as it is available in large tracts in the country. To date, an estimated 120 000 ha of peat have been planted with oil palm. This is in spite of its many inherent chemical and physical properties which are constraints to oil palm planting. Over the years, many active R&D studies have been carried out to arrive at the optimum agro-management inputs for the planting of oil palm on this soil. These include the areas of nutrition, planting density, land preparation and planting technique, drainage and water management. Peat is often located in the low-lying areas and often inundated with water. Together with the high organic matter content, these conditions encourage the presence of pests and diseases including Ganoderma or basal stem rot (BSR) which pose a serious threat to the future expansion of the oil palm industry. The threat of Ganoderma warrants new and more aggressive approaches in finding solutions to the problem.
Transfer of Technology Seminar

This annual seminar was held on 6 May in conjunction with the Seminar on Elevating the National Oil Palm Productivity. This seminar saw the launching of 47 new products and technologies by MPOB. The seminar involved exhibition of the new technologies, booth presentation and discussion with inventors. There was also an exhibition of previously launched technologies. The seminar presented an opportunity for members of the industry and public to:

- be informed of MPOB’s latest research findings, products and processes;
- license the technologies for commercialization;
- adopt the findings for use in individual organizations; and
- explore potential areas for collaborative development of the technologies.


The roadshows were jointly organized by MPOB and the Malaysian Energy Centre and held at MPOB Headquarters. The Inaugural Roadshow held at MPOB Headquarters was officially launched by the Honourable Minister of Primary Industries, Dato' Seri Dr Lim Keng Yaik and attracted 185 participants of whom 173 were from industry and 12 from MPOB. The Regional Roadshow was held at the Swiss Garden Resort, Pahang on 30 April and was targeted to the palm oil millers, entrepreneurs, consultants, contractors and suppliers of machinery and services related to the power industry. Thirty five members from industry and two from MPOB participated in this workshop.

The objectives of the roadshows were:

- to provide a forum for meaningful interactions among the government bodies, financiers, private entrepreneurs and service suppliers so as to develop new business opportunities;
- to inform the participants on the mechanism of application to generate renewable energy and negotiation for sale to TNB; and
- to identify and deliberate on issues that may arise in the implementation of the SREP programme.

In the palm oil industry, the generation of steam and electricity from palm biomass, in particular the shell and fibre is well established. This form of renewable energy is limited for its own in-house and self utilization in the confined areas surrounding the mill. Studies indicated that the existing mills have the potential to generate 365 MW and 177 MW of power from the biomass and biogas from palm oil mill effluent respectively which until this time have still not been resourcefully utilized.

The Malaysian Government launched the SREP Programme in May 2001 which allows independent small power plants to sell electricity to TNB for distribution. This is in line with the government’s aspiration to intensify the development of renewable energy as the alternative fifth fuel resource under the country’s Fuel Diversification Policy. In view of the abundantly available biomass resources, the palm oil industry will be able to play an important role to replace 5% of the country’s present electricity requirement with renewable energy sources by 2005, a target set by the government.

This new business opportunity to generate power for sale has moved very rapidly and in the 2001 budget, various tax incentives were proposed to promote it. Among the incentives are tax exemption, tax allowance and exemption of import duty and tax on imported machinery and equipment.

It is thus timely that the Malaysian palm oil industry seriously considers venturing into the energy sector not only to enhance the economics of production of palm oil but also to portray the industry as contributing positively to the global initiative in the reduction of greenhouse gases to the environment.