Apr - Jun 2016 Volume 3

A quarterly palm oil newsletter brought to you by IChemE Palm Oil Processing Special Interest Group

POPSIG

IChemE

Cover Story

In the News

POP SIG gratefully acknowledges the following sponsors:

Monash University Malaysia,
for provision of venue facilities and refreshment

Desmet Ballestra Malaysia,
for sponsoring quarterly newsletter

The University of Nottingham,
for provision of venue facilities

Editor's Message

POP SIG has its fourth evening talk held in the first quarter of 2016 at Monash University Malaysia. Committee members attended Price Outlook Conference (POC 2016) organized by Bursa Malaysia, and visited both RSPO and PORAM offices. POP SIG was invited to deliver talk in Palm Oil Milling Technology Colloquium 2016 organized by UPM-UiTM-UTM Long-Term Research Grant Scheme (LRGS) Palm Oil Milling Technology Research Group. This colloqium provides a strategic platform for the dissemination of ideas and the exchange of knowledge between young researchers and the experts from both the academia and industries that pertain to technology and inoovation in the plam oil milling industry. In April 2016 Issue 898 *The Chemical Engineer*, Chair of POP SIG looks at the palm oil milling steps and investigates how chemical engineers can improve them.

Polycarbonate can be recycled using glycerol

Glycerol is a byproduct of biodiesel production. A new chemical technique to recycle polycarbonate plastics using cheap, easy to obtain, and environmentally-friendly glycerol which was invented by Deepak Pant, an associate professor at the Central University of Himachal Pradesh, India, is now tested can recover up to 98% of the plastic's monomer, bisphenol A (BPA), for reuse.

Polycarbonate plastics are difficult to recycle mechanically due to the low quality of the recovered material, while many chemical recycling processes use harsh reagents or conditions. Polycarbonate was discovered in 1898, and it is estimated that by the end of 2016 4.5m t of the plastic will have been produced, which creates a waste and recycling challenge.

Pant says that his new recycling method is both green and economic. Pant tested raw glycerol against analytical grade glycerol, using both to recycle scrap optical discs. The three-part process first involved pulverising the scrap discs into 2–3 mm pellets. The optical aluminium layer is removed by vibratory shaking – the heavier polycarbonate particles sink to the bottom. The pulverised polycarbonate pellets then go through a digestion step. Pant mixed the pellets with glycerol, Na_2CO_3, a zinc oxide catalyst, and urea, which improves the yield of the desired BPA products and slows the breakdown of glycerol, making it reactive for longer. The mixture is heated to 120˚C for 15 minutes and then to 170˚C for 90 minutes. During the reaction the digested polymer further reacts in an alkoxylation process, giving the desired BPA monomer. After being cooled to room temperature, methanol is added. The mixture is then filtered to remove unreacted polymer, leaving a methanol solution of the BPA. The carbon dioxide and ammonia produced as by-products can be easily removed by collecting them over water.

While lab scale has been tested, it's the time for us as chemical engineer to look at scaling up the process.

B10 biodiesel rollout

After several postponements, Malaysia is confident of implementing the B10 biodiesel programme this year.

Plantation Industries and Commodities Minister Datuk Amar Douglas Uggah Embas said they were currently at the tail end of a very "extensive consultation" process. "I am confident it will be this year," he said during a press conference at the Palm and Lauric Oils Conference and Exhibition, Price Outlook 2016/2017.

Meanwhile, if the B10 is implemented, the Malaysian Biodiesel Association expects the utilisation of palm oil for biodiesel to rise to 1.2 million tonnes per year, of which 0.8 million tonnes will be for the transport sector, with the remaining 0.4 million tonnes for industrial use.

The Chemical Engineer: What can chemical engineers do to boost the efficiency of palm oil milling?

Chemical engineers are an integral part of this important role in palm oil milling. The objective of milling is to extract the maximum amount of palm oil from the fruit at minimum cost. Like chemical engineers in other industries, we rely on our knowledge of mathematics and science, particular chemistry, in palm oil milling to overcome technical problem safely and economically.

While few examples were given on how chemical engineers can improve the palm oil milling efficiency ie sterilization, clarification etc., the reality is that we have many more challenges, such as process safety and pollution control, to address to meet the needs of the industry.

In the meantime, to help address the challenges to get chemical engineers to work in palm oil industry, POP SIG is ready take up the lead role to work with universities to raise awareness among students about how their skills in process control, heat transfer, mass balance and so on can be directly applied to and benefit the sector .

We hope you enjoy reading these and the full selection of articles in this issues. Follow us on Facebook and LinkedIn. You can also email us, ATan@icheme.org directly with your thought and critique.

Editor

Hong Wai Onn

A milestone innovation in the Palm Oil Industry - The Latest Development in Palm Oil Fractionation

The fourth POP SIG evening talk was held on Monday 29th February 2016 at Monash University Malaysia in Bandar Sunway, Subang Jaya. It was attended by more than 50 participants with new faces from the palm oil refineries. The speaker was Mr K K Khoo, MD of Desmet Ballestra in Asia. Mr Khoo who is a Fellow of IChemE spoke on "The latest development in palm oil fractionation."

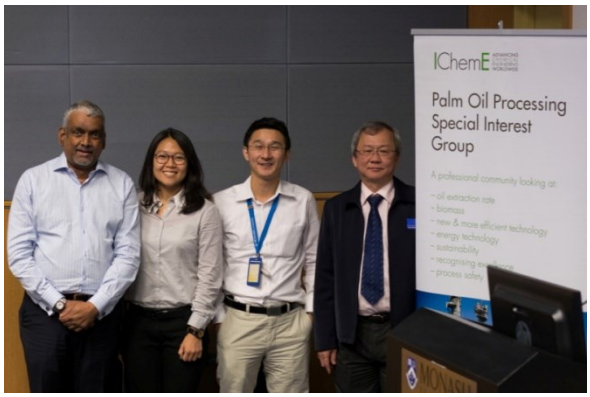
Batch STR crystallization prior to filtration has been the established norm in the palm oil refining industry since the late 1970s to produce a variety of products including palm olein which is an important cooking oil. There are a number of shortcomings such as crystal deposits, fouling, product variability and inconsistency. In 2011 Desmet Ballestra came up with a continuous crystallisation process realised with plug flow cooling. Its MoBulizer design made this possible, achieving increased throughput, yields, lower energy consumption and better consistency of product quality. This innovative technology also makes the operation much simpler with less process settings required. There are now more than 20 installations world wide. Mr Khoo's presentation was clear, aided by particles and temperature simulations.

In response to a question Mr Khoo said that although most of these processes were dedicated to palm oil fractionation and its fractions – superoleins, superstearin and mid fractions, it was also used for rice bran and fish oil. It is also possible for other vegetable oils and fatty acids. The audience was so enthusiastic that a member suggested the innovation should not be limited to triglycerides and should find a far wider industry application.

Mohammad Jaaffar Ahmad, CEO of PORAM said, "The presentation is timely for refiners to evaluate new technology that could enhance their processing capability and optimise their operational efficiency. Our refining industry is more than 40 years old now, therefore new innovations and ideas are most welcomed."

Wong Hwa Sin, Plant Manager at Southern Edible Oil commented that the talk was fantastic and excellent. His colleague Lai Fu Khate, a chemical engineer supported him saying, "Interesting, short and sweet."

Associate Professor Dr Chan Eng Seng, Head of Chemical Engineering at Monash University Malaysia said, "We are pleased to host the talk with IChemE recognising the importance of the palm oil industry to Malaysia and the region."



Top: Thanks to Dr. Chan, Monash University Malaysia, for hosting the talk.

Left: The speaker, Mr Khoo Kiak Kern.

Bottom: Ms Liew Sin Lu, Technical Manager, Desmet Ballestra, helping to answer questions.

Top: Wong Hwa Sin asking a question. Colleague Lai Fu Khate is next to him.

Right: Former Mewah colleagues meeting up. Associate Fellow Harcharan Singh, Senior Vice President, Technology Management & Innovation at BiotechCorp and Mohammad Jaaffar Ahmad, CEO of PORAM .

Sustaining Sustainability

(L to R) Salahudin Yaacob, KS Qua, Datuk Darrel Webber, Mohan Balasingam, Dr David Brown, Bakhtiar Talhah

IChemE led by Dr David Brown, CEO met up with RSPO Secretary General Datuk Darrel Webber and Technical Director Salahudin Yaacob on Wednesday 3rd February 2016 to explore the philosophical linkage in sustainability.

Webber briefed us on what is ahead for RSPO in the next 12 to 24 months. On the horizon is the RSPO NEXT launch on 9th February. It is a voluntary add on programme to the RSPO P&C Certification on the themes of No Deforestation, No Fire, No Planting on Peat, Reduction of GHGs, Respect for Human Rights and Transparency.

There is now commitments by the Governors of Sabah, Central Kalimantan and South Sumatera to Jurisdictional Certification to ensure all palm oil produced within their state jurisdiction will be certified sustainable in the years to come. As a common practice, certification targets single plantations or mills that belong to companies or smallholders, with the latter often facing challenges in implementing deforestation and greenhouse gas emissions requirements.

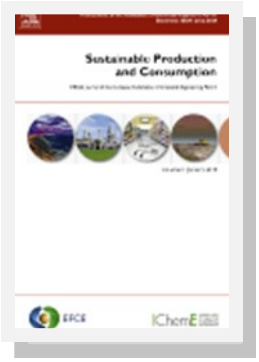
The RSPO continues to work on uptake of certified sustainable palm oil. The Amsterdam Declaration in support of a fully sustainable palm oil supply chain by 2020 as well as push on the east and west coasts of USA are recent successes. Webber says that the turning point will be when 50% certified sustainable palm oil is available (now 20%) and premiums will no longer be a key feature.

Using LiDAR technology allows RSPO to monitor hotspots for signs of fires on RSPO certified concessions and possibly make traceability to the tree level. The RSPO can now publish all digital maps of its members oil palm concessions worldwide, except for Malaysia, where the legality of the public disclosure of concession maps continues to be ambiguous within the laws of the country.

The challenges ahead are nationalistic eg Malaysian Sustainable Palm Oil (MSPO) and the proliferation of traceable and/or sustainable platforms/standards. Nevertheless RSPO has the longest history and the widest reach globally.

Dr Brown said IChemE can look at how to take part in RSPO's story. It has relevant technical groups such as the Palm Oil Processing Special Interest Group (POP SIG), the Sustainability SIG and the Water SIG. RSPO members are encourage to participate in these and we invite RSPO to give a talks at SIG events.

IChemE has a new Sustainable Production & Consumption Journal and invite members of RSPO with links to the research base to make submissions of their own.



http://www.journals.elsevier.com/sustainable-production-and-consumption/

Price Outlook Conference (POC 2016)

By Dennis Tang

The trio of the palm industry Guru - Dr James Fry, Thomas Mielke and Dorab Mistry are confident the bullish momentum of the CPO price could touch above RM3,000 by mid of the year 2016.

The El-Nino effect is one of the strongest since 1997/1998, the experts predict if this phenomena continues, it may affect the palm production throughput by 1.2 – 2.0 million MT of CPO. In additional to that, Indonesia government introduces a new levy to tax the exported CPO and translate the tax income to subsidy their ambitious biodiesel program. The factors above believed will push up the floor price of CPO to above RM3,000 by second half of 2016 .

More than 1000 delegates have participated this important annual event in Shangri-La from the 7 – 9 March 2016. The exhibition hall was crowded with delegates and visitors from all over the world to come for networking and exploring new trades opportunities. Particularly this year, delegates were able to enjoy the delicious pastry made from palm derived product at the Wilmar exhibition booth.

Acidchem SHINES in the Prime Minister's Hibiscus Award


PMHA Penang State Trophy and PMHA Challenge Trophy

IOI Acidchem Sdn. Bhd; formerly known as Acidchem International Sdn. Bhd; shines with its haul of recognitions at the environmental-themed Prime Minister's Hibiscus Award ceremony. The wholly-owned subsidiary of IOI Oleochemical Industries Bhd, which belongs to the IOI Group, received the highest accolade in environment management by winning the prestigious Challenge Trophy which is presented to the overall awardee with the highest performance. The award was presented by Deputy Prime Minister Datuk Seri Dr Ahmad Zahid Hamidi on Monday. Natural Resources and Environment Minister Datuk Seri Dr Wan Junaidi Tuanku Jaafar was also present. The Prime Minister's Hibiscus Award (Anugerah Hibiscus Perdana Menteri), first launched in 1996, is the premier private sector environmental award for business and industry in Malaysia. The 2012/13 award was won by Shell Refinery. PETRONAS Carigali won in 2010/11. This is the first time a palm oil player has won.

IOI Acidchem has also been accorded the Excellent Achievement in Environmental Performance in the 2014/2015 Prime Minister's Hibiscus Award and retained Penang State Award it won previously, the state awards are presented to the best awardee from participating states.

Held biennially, the Prime Minister's Hibiscus Awards is Malaysia's premier and most prestigious environmental awards. This award is jointly organised by the Business Council for Sustainable Development in Malaysia, Environmental Management and Research Association Malaysia, Federation of Malaysian Manufacturers and Malaysian International Chamber of Commerce and Industry. The award was supported by the Natural Resources and Environment Ministry and its Department of Environment. Eligibility extends to companies from any industrial or other sector operating within Malaysia.

The objectives of the Award are to present an opportunity for public recognition of business and industry's environmental accomplishment and leadership and to create environmental awareness amongst enterprise that have yet to demonstrate stewardship. Through participation in the Award, enterprises are able to identify areas for improvements, build capacity and development partnerships to meet increasingly stringent local and global environmental requirements.

IOI Acidchem bagged the awards as a result of excellent performance in several key areas including commitment and involvement of top management, assessment and management of environmental issues, provision of environment related training, and commitment to environmental social responsibility activities. Some of the commitments demonstrated by the company include the use of green energy through solar power harvest and use of the efficient combined heat and power generation systems, employing highly efficient eco-friendly process technologies such as reactive distillation and chemical-free processes whist reducing the use of resources, waste generation and GHG emission.

The company acknowledges the importance of not only excellent execution but one that is consistent and sustained. IOI Acidchem will continue to enhance its processes and embark on more eco-themed projects.

Top Left: Job well done: IOI Corporation Berhad chief executive officer Datuk Lee Yeow Chor (right) receiving the Prime Minister's Hibiscus Award 2014-2015 award on behalf of IOI Acidchem from Dr Ahmad Zahid. Looking on are (from left) Business Council for Sustainability and Responsibility Malaysia (BCSRM) honorary president Datuk Kok Wee Kiat, Natural Resources and Environment Minister Datuk Seri Dr Wan Junaidi Tuanku Jaafar and Prime Minister's Hibiscus Award organising committee chairman Tan Sri Mustafa Mansur.

Top Right: Mr. Tan Kean Hua, Executive Director, IOI Oleochemicals Industries Berhad, also a Fellow of IChemE, receiving the Penang State Award for IOI Acidchem, being the Best assessed company in the state.

Workshop on Industrial Biogas Application in Industry and Agriculture Chiang Mai, Thailand 15 - 18 March 2016

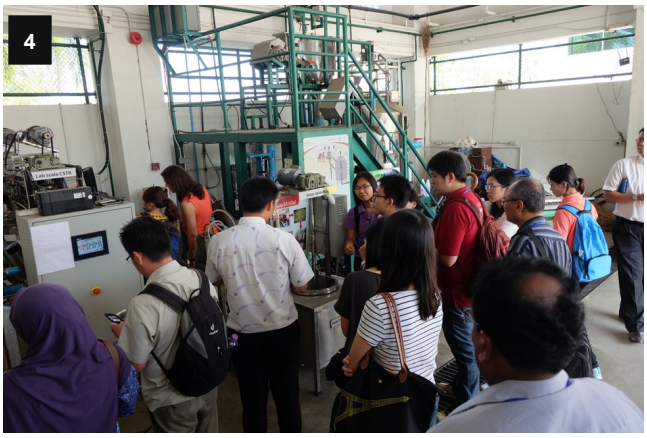
By Professor Dr. Chong Mei Fong

It was a sunny morning when I was warmly greeted by friendly participants on the first day of the workshop. At a glance, there were about 50 participants from all over the world including Germany, US, Japan, Singapore, Indonesia, Malaysia and Vietnam besides the overwhelming support from Thailand. 65% of us were academic while the rest were from various private and research organizations.

It was interesting to find that the Workshop was aimed to establish with greater clarity the present position of individual ASEAN member countries with respect to technology and infrastructure for treating waste streams using biogas technology. The Workshop began with sharing sessions by invited speakers from countries with leading biogas technology. This include the speakers from Germany, US and Japan. A paper on microbiology was presented too.

The second day of the workshop started with my presentation for my country, Malaysia. Malaysia being one of the largest world palm oil producer, palm oil mill effluent as the major substrate for biogas was an obvious focus point in my presentation. I was glad to get to know that Malaysia is at a leading position with systematic Feed in Tariff Policy to encourage the development of biogas technology as compared to our neighboring country like Thailand which started about 10 years earlier than Malaysia.

The last day of the workshop ended with site visits and a wonderful dinner. Our friendship grew instantly with amazing outcomes! The immediate follow on activities included several papers, a book and formation of a microbiology group. I had also found many new friends and I would like to thank Morakot Regional Centre for Industrial Biogas and Wastewater R&D and its Director Terry Commins for organizing such a wonderful Workshop. I am looking forward to meet my new friends again!



1: Terry Commins, Director of Morakot Regional Centre for Industrial Biogas and Wastewater R&D, started the day off by explaining the purpose of the workshop.

2. Prof. Mei Fong Chong reporting the biogas industry of her country, Malaysia.

3. Participants at the breakout session.

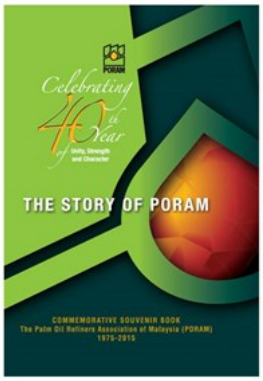
4. Participants at the lab scale bio-digesters at a research center in Chiang Mai.

Refining Relationships

PORAM and IChemE met up again on Monday 15th February 2016 to continue discussions on working together. PORAM was represented by its CEO, Mohammad Jaaffar Ahmad and deputy CEO, Teoh Beng Chuan as well as Executive, Md Saiful bin Md Hussin. IChemE was represented by Mohan Balasingam, Regional SEA Manager and K S Qua, Professional Formation.

(L to R) Teoh Beng Chuan, Mohan, Balasingam, Mohammad Jaaffar, Qua KS

Mohan updated on the new developments at IChemE starting with the SEA Director, the Palm Oil Industry Award that was introduced at IChemE Malaysia Awards 2015, the Palm Oil Processing Special Interest Group (POPSIG) and our continued focus on process safety including the IChemE Safety Centre. Qua gave out hard copies of the POPSIG Q1 2016 newsletter and took them through the contents.



Jaaffar said that PORAM had just celebrated 40 years with the publication of a coffee table book.

"The Story of PORAM". A copy was given to us and the contents will be an extremely valuable reference as it not only traces the history of the palm oil industry but lists PORAM members and collaborative partners such as MOMG and MBA.

We explored plant efficiency, production innovation and process safety. IChemE invited PORAM members to participate in its Special Interest Groups particularly POPSIG and Safety & Loss Prevention (S&LP) which are free at the moment. There are opportunities to network with others from all industries and academia.

IChemE will keep PORAM on its mailing list so that it can share with its members the quarterly POPSIG news as well as the evening talks.

Diary of Events

Webinar	: **Introduction to the Palm Oil Industry**
Speaker	: Ir. Qua Kiat Seng
Date	: 11 May 2016
Time	: 16:00 - 17:00 (GMT+8)
Location	: http://www.icheme.org/communities/countries/malaysia/events/2016/webinar-popsig-11-may.aspx
Evening Talk	: **The Biomass Complex in Palm Oil Industry**
Speaker	: Professor Denny K. S. Ng
Date	: 23 May 2016
Time	: 18:00 - 20:30 (GMT+8)
Location	: Monash University Malaysia, Bandar Sunway, Subang Jaya, Malaysia

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Call for Speakers

The POP SIG's evening talks and webinars are free and open to all, at the moment. Membership of POP SIG is not only for chemical engineers but for anyone interested can join as an Affiliate member. The presentations are directed towards audiences who would like to know more factual information about Palm Oil Processing industry and who would appreciate an opportunity to ask question. The committee is looking to ensure presentations cover palm oil milling, refinery as well as oleochemical. If you'd like to volunteer to give a presentation – either at a physical seminar or via an online webinar - then please get in touch, providing some details about yourself and your proposed talk. Contact Professor Dr. Chong Mei Fong, meifong.chong@nottingham.edu.my, or Avanna Tan, specialinterestgroups@icheme.org, today.

POP SIG Committee

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Secretary : Professor Dr. Chong Mei Fong AMIChemE

Committee : Qua Kiat Seng FIChemE Chow Boon Ping FIChemE Khoo Kiak Kern FIChemE
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