

Biomalaysia 2009: News and Views from Biotech Industry¹

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Abstract: Biotechnology does have potential to contribute in addressing the global challenges and to make human life better. Biotechnology is extensively used in agriculture, health care, environmental and industrial sectors. Scientists, federal governments and multinational private companies (MNC) around the world are employing modern biotechnology for the benefit of their people and nation. Malaysia is having incredible natural resources and these natural resources are one of the biggest assets of Malaysia. By understanding the potential of becoming a regional biotechnology hub, Malaysia is taking right steps to achieve this goal. Both foreign and local investors are investing heavily in Malaysia's biotech industry due to the fascinating national biotech policies of the Malaysian Government. BioMalaysia is an annual premier biotech event of Malaysia which provides a strategic platform for exchange of fresh ideas, practical solutions, networking for potential collaborations and brings in biotech experts (Scientists), industry players and all other stakeholders together. Some of the viewpoints of speakers are highlighted in this article.

Key words: Agribiotechnology • Biotechnology • Food • Health • Malaysia • World population

INTRODUCTION

Biotechnology is playing and will play an important role in solving the challenges in agriculture, health care, environmental and industrial sectors of the biotech industry. All the countries around the world are trying at their level best to employ modern biotechnology for the benefit of their people and nation. Malaysia is having incredible natural resources and these natural resources are one of the biggest assets of Malaysia. By understanding the potential of becoming a biotechnology hub, Malaysia is taking right steps to make sure that it will get its slice of the lucrative market and to empower Malaysia as the leader in Biotechnology. Due to fascinating biotech policies of the Malaysian Government both foreign and local investors are investing heavily in Malaysia's biotech industry.

BioMalaysia is an annual premier biotech event of Malaysia which provides a strategic platform for exchange of fresh ideas, practical solutions, networking for potential

collaborations and brings in biotech experts (Scientists), industry players and all other stakeholders together. BioMalaysia 2009 was held in November 2009 which highlighted the progress of the Malaysian biotechnology industry and took a look at all the latest developments in various biotech sectors including agriculture, health care, industrial and bio-informatics industries. This time the theme of the conference was "Accelerating Commercialization in Biotechnology",

In three days conference, there were two keynote sessions, five plenary sessions, one single track bioentrepreneurship session and eight concurrent sessions namely, food and agriculture, healthcare, industrial, regulatory framework, bioinformatics, bioethics, pharmaceuticals and sponsors track. More than 800 trade visitors, more than 200 exhibition booths of various companies/organizations and more than 11,000 participants from over 40 countries participated in this 3 day event. It is tricky to talk about all the views of speakers and papers presented in scientific conference of

¹A report on the 'BioMalaysia 2009', held at Kuala Lumpur Convention Centre, KL, Malaysia during 17-19 November 2009 and jointly organized by the Ministry of Science, Technology and Innovation (MOSTI), Malaysian Biotechnology Corporation and Protamp Exhibitions Pvt Ltd and supported by Malaysian Bioindustry Organization (MBIO) and Malaysian Biotechnology Information Centre (MABIC).

BioMalaysia 2009. However, the selected papers and viewpoints which could give the essence of the whole conference are mentioned in this news article.

Cancer is one of the leading causes of death worldwide and the total number of cancer cases is increasing globally. In the opening plenary talk of conference, an enlightening review on the 'Manipulating the immune system for cancer therapy and drug development' was presented by Ken-ichi Arai (UoT, Japan). He highlighted the knowledge advancement in cancer science and the strategies to develop therapeutic products by manipulating the regulatory network of innate and acquired immunity. Antibodies, cytokines, oligodeoxynucleotides and dendritic cell therapy development efforts to deal with cancer by his research group were also highlighted by him. He emphasized that these developments must be supported by a translational research platforms such as genomics, proteomics and cell processing facilities to be established among Asian countries. However, cancer prevention is an essential component of all cancer control plans because about 40% of all cancer deaths can be prevented. By giving an example of biotechnology in Silicon Valley he underlined three important elements for the successful venture namely, open and top universities that can attract talents worldwide, access to international airports within 30 minutes and favorable living conditions. Alexandre F.J. (Novartis International AG, Switzerland) in his plenary talk discussed importance of leveraging on strategic alliances and collaboration to take discoveries to the market. He highlighted that RandD costs are high and rising in medical research and there is a high risk of failure. A complex network is required for innovation; and collaborations are important to accelerate growth, access critical capabilities, enter new markets, build critical mass, accelerate RandD and for reduction of costs. He also tinted that IPR protection is vital for continuous innovation.

Track 1 was devoted to food and agriculture. The production of rice in Asia and the World is 600,541,000 and 661,811,000 tons respectively (USDA). It's a daily food for majority of human population. Modern biotechnology can be used for nutritional quality improvement of important commodity like rice. In this context, Sun-Hwa Ha (NAAS, Korea) highlighted that her research results are positive in developing rice with functional carotenoids like lycopene, zeaxanthin and astaxanthin through multi-step genetic engineering of carotenoid biosynthesis. In the future, high yielding and nutritionally enhanced rice varieties can be developed

through this research. Tan C.S. (MARDI, Malaysia) told audience that through MARDI's research the protocols for large scale cultivation are ready for a rare but a valuable Malaysian medicinal mushroom called '*Lignosus rhinocerus*'. Malaysian local communities are using this mushroom to treat asthma, cough, fever, food poisoning, wound healing, cancer and as a general tonic. These mushroom based products will be in the market soon. In Muslim community, the food products that contain ingredients such as blood albumin are treated as *haram* or questionable at best and should be avoided in food product formulation. In this context, Salmah Y. (USI, Malaysia) highlighted in her talk that ELISA can be successfully used in detection of presence of non-halal proteins and this can be further confirmed by using polymerase chain reaction (PCR) methods. John B. (University of Stirling, UK) in his talk highlighted that the global rate of growth in aquaculture production is declining due to limitations of the current technologies. He also underlined the need of advancement in our understanding of genetics and genomics to be able to produce better breeds suited to emerging farming systems and to deliver a greater range of products in the value chain. Wouters J. A. (NIZO Food Research, Netherlands) gave a comprehensive talk on new developments in the field of fermentation and highlighted its applications in the areas of flavor, texture, health, food safety, food physics and downstream processing.

In the healthcare session (Track 2), five speakers delivered their talks. *Herpes simplex* viruses 1 and 2 (HSV-1 and HSV-2) are two species of the herpes virus (family, Herpesviridae) that are known to cause infections in humans. This virus may produce life-long infections and it is estimated that about 4 billion people worldwide carry the *Herpes* virus. The WHO report indicates that 550,000,000 people are estimated to have HSV2 of the genitals. The current treatments usually involve general-purpose antiviral drugs which reduce the infection, but do not completely eliminate it. Field H. J. (University of Cambridge, UK) gave an enlightening talk on latest developments in treating infections caused by HSV-1/HSV-2 and *Varicella-zoster* virus. He highlighted that nucleoside analogues are NOT fully effective in treatment and there is still a large market for new, effective herpes antivirals. He also highlighted that HSV Helicase-Primase Complex a novel target for its inhibition and updated the audience on progress made by his research team. It appears that helicase primase inhibitors (HPI) are promising in herpes treatment. Human brain neural network and systems composed of billions of neurons is

important in functions such as human behavior, emotions, vision, smell, learning and memory and thought process. The disorders in brain and nervous system do have huge implications on our society worldwide. In this context, Ishwar P. (Monash University, Malaysia) gave a comprehensive talk on the breakthrough discoveries of the causes of nervous system diseases. He highlighted that research in this science takes time and is expensive, but the number of private and public neurotech companies are on the rise and enormous progress has been made in molecular biology of nervous system disorders.

In healthcare industry, human genomics is going to play a vital role in pharmaceuticals, but it will take some time. On this issue, Wills Q. (SimuGen, Malaysia) highlighted that the inability of the genomics to deliver on its promises is due to technological limitations and argued that the benefits to be drawn from pharmacogenomics is not in a sense of personalised medicine but rather in drug discovery. At the same time we should not ignore the potential of natural traditional medicines and should take advantages of their biological diversity. In this line, Frank Petersen (Novartis Institutes for Biomedical Research, Switzerland) delivered a talk on 'leveraging biological diversity in modern drug discovery'. He highlighted that traditional herbal remedies are rewarding sources for new therapeutic concepts and based on this Novartis has developed a new combination therapy against multi-drug resistant malaria based on artemisine in collaboration with Chinese institutes, companies and government authorities. Robert I. R. (Entogenex Industries Sdn Bhd, Malaysia) talked about biotechnologies for control of mosquitoes that transmit human disease(s). He highlighted that mosquitoes are responsible for transmitting number of human diseases including Malaria. Malaria is one of the top ten human diseases and more than 1.3 million patients deaths are recorded per year. In Africa, due to malaria a child dies every 30 seconds. He argued that the potential impact of global warming on human health may cause increase of mosquito-borne diseases and *Bacillus thuringiensis*, *Bacillus sphaericus* grown and *Lagenidium giganteum* (an aquatic Oomycetes fungus) can be used in mosquito control.

In Track 3, five speakers talked about various issues important for biotech industry. Borovsky D. (University of Florida, USA) who is well known in molecular biology of hormonal control of insects and insect biochemistry research gave a talk on novel approach of controlling malaria in Africa. Previously Spielman A. (Harvard)

reported that maize pollen grains are used by mosquito larvae in sub-Saharan Africa as the main food source. As an expert in insect control, Borovsky D realized the importance of this research finding and his developed transgenic maize which will express *Bacillus thuringiensis israelensis* (Bti) toxins and trypsin modulating oostatic factor (TMOF) which can selectively and effectively control malaria transmitting mosquito larvae in Africa. This novel approach can be used in other parts of the world where malaria needs to be controlled effectively. Douwe de Boer A. (Genetwister Group, Netherland) highlighted the development of DNA markers using latest technologies (e.g. SNPs, single nucleotide polymorphisms) and their applications in developing superior cultivars. Based on vegetable fats and oils data, Malaysia is 2nd largest producer of the palm oil and Malaysian Palm Oil Board (MPOB) is devoted for the research and development on oil palm industry. Kushairi A. (MPOB, Malaysia) in his talk summarized various activities of the MPOB for developing value-added products in oil palm using genetic engineering and traditional oil palm breeding means. He also highlighted that in the near future MPOB will have 1.2 hectare in size transgenic greenhouse for large scale evaluation of transgenic oil palm. Oil palm is known to produce 3.9 tons of oil per hectare per year; almost ten times more than other oil producing crops. Because of high yield, oil palm does have the potential to meet the growing demand for food and renewable fuel. In November 2009, MPOB announced the 94% completion of oil palm (*E. oleifera* and *E. guineensis* Jacq. including the pisifera and dura palms) genome sequencing. Toine P. (Feyecon Asia Sdn Bhd, Malaysia) spoke about supercritical fluid (SF) technology and developments in the SF technology. He highlighted that SF technology is the platform technology and can be used to sustainably exploit the natural resources.

Roger W. (Burrill and Company, USA) gave a keynote talk and highlighted that the governments support and commitment is very crucial for the advancement and progress of biotech industry. He also highlighted that government must provide a vision for the green economy, incentives aligned with outcome, consistent and predictable regulatory environment, support access to global innovation, access to risk capital and funds for mission oriented research. Bhatt M. (Avesthagen Ltd, Bangalore, India) gave a plenary talk on 'Biotech opportunities in emerging countries' highlighting that India and Asia Pacific region is becoming an attractive destination for RandD activities in the biotech

industry as biotech companies are trying to counter the economic crisis in US and EU markets. He also highlighted that collaboration between India and Malaysia in biotech sectors such as bio-manufacturing, stem cell research, pre-clinical and clinical trials are rising by complementing strength of each other though there is a shortage of venture funds. During the global economic downturn, Indian economy was not affected significantly; the economy expert's prediction is that the Indian economy may grow by 9 per cent in the next fiscal year. Why Indian economy is growing while most of the countries are suffering from global economic crisis was one of the talking points in QandA session. Bhatt gave credit to policies adapted by Indian Government. Sinskey A. J. (Massachusetts Institute of Technology, USA) gave a comprehensive plenary talk on metabolic engineering strategies for biological carbon storage in context with opportunities in biofuels and biomaterials. He highlighted that the ability of microorganisms to accumulate and store polyhydroxyalkanoates (PHAs) and triacylglycerides (TAGs) can be exploited for biofuels and biomaterials (biodegradable plastic) production. He argued that the advances in genetics, biochemistry and genomics make metabolic engineering a feasible strategy for microbial production of biofuels and biomaterials. He also highlighted that availability and use of low-cost biomass is one of the economic drivers and while answering a question from audience he suggested do not ignore biofuels and biomaterials production capacity using plant system. L. Val Giddings (PrometheusAB, Inc, USA) gave a revealing plenary talk on 'Biotechnology and global food security'. He highlighted that the last year brought in significant developments in all biotech sectors but more significantly in agriculture sector. He argued that in EU policies contradicted by data and experience have created acute supply crisis which threaten high cost penalties and market disruptions. According to him, situation is similar in Asia where lagging policy development has contributed to an emerging spectrum of economic potential and commercial promise. Human population is increasing and to meet the growing global food demand is a huge challenge due to shortage of fertile agricultural land, water for irrigation, changing rainfall patterns and global warming.

Ramakrishna D. (KASS International Sdn Bhd, Malaysia) highlighted that while dealing with intellectual property (IP) rights, the technology mining is essential to ensure that we know what technology has been patented, in order to avoid infringement. He also argued that it is important to know what technology has not been

patented so that we can explore the possibility of utilizing the same in our research. Behzad G. (ABRII, Iran) gave an enlightening talk on modern agriculture biotech industry scenario in Iran. He highlighted that production of a cloned sheep and a goat for the purpose of producing pharmaceuticals in their milk is the achievement of Iran. He also claimed that Iranian scientists are in process to fully commercialize the insect and fungal disease resistant transgenic cotton developed at ABRII. Lim T. O. (CRC, MOH, Malaysia) highlighted that clinical research outsourcing industry in Malaysia is growing rapidly and the estimated revenue from it in year 2008 was about RM 120 million (~US\$ 35.6 million). He told audience that Malaysia's regulatory framework is up and running. In Malaysia, Sarawak is the largest state and is full of natural resources which are not tapped for their potential benefits. In line with it, Rita M (SBC, Sarawak, Malaysia) gave a comprehensive overview on activities of the Sarawak Biodiversity Center (SBC) and highlighted that SBC is in favor of benefit sharing and recognizes the owners of the traditional knowledge (TK) and genetic resources linked to TK.

Many genome projects are completed so far and data mining is going on. Hubert R. (ITRI, Taiwan) discussed the issues associated with Genomics and what is needed for genomics to deliver. He argues that healthcare sector is faced with hard business conditions and need to reduce costs while improving efficiency while simultaneously enjoying the prospects of personal genomics in the near future. Habibah A W. (MOSTI, Malaysia) gave a talk and highlighted that there is a huge potential for the discovery of new drugs, nutraceuticals, pesticides or other bioactive compounds from Malaysia's untapped natural resources. She also highlighted the discovery of potent anti-influenza, anti-TB, anti-dengue chemotherapeutic agents by her research team. Joe Z. (Genor Biopharma, China) in his talk highlighted that current timing, cost effectiveness, strong economy, government support and great infrastructure in China provides excellent opportunity for Bio-process and Bio-manufacturing. He argues that advanced technology plus smart design of facility and pre-clinical/clinical together with flexible bioprocess, it is becoming possible to share the pie with giants in biopharmaceutical industry.

Bioethics is an important issue in the biotech industry and in this context Ida M.A.G. (IIUM, Malaysia) argued that the moral issues would be crucial in determining the commercial success of any biotech product; and suggested that patent office must work in collaboration with other parties involved in the process of

standards, halal certification and religious issues to iron out any ethical and moral doubts that could have been raised pertaining to a particular genetically engineered products and processes. Solbakk J.H. (UNESCO, Norway) discussed the various issues in biotechnology in association with human rights.

In a plenary talk Nazrin H. and Kenny M. (Cradle Funds Sdn Bhd) highlighted that entrepreneurship is nothing but the practice of consistently converting good ideas into profitable commercial ventures and Cradle Funds Sdn Bhd provides funding to do so. Zubir A.Y. (Malaysia Debt Ventures Berhad, Malaysia) gave a comprehensive talk on key components of the entrepreneurship and highlighted the 8 habits of successful entrepreneur namely, early riser, willingness to delegate, pursuit of opportunities, optimism, proactive, ruthless-low tolerance for failures, obsession for details and perseverance. Sandra C. (Accelerating Michigan's Entrepreneurs, USA) gave a very comprehensive overview on how to build an entrepreneurial management team. She highlighted that for the success of biotech companies understand the roles your company requires, evaluate founders ability to fill these roles, plan to build a management team that can meet your business needs as they evolve, create a comprehensive plan that will help in attracting or retaining top talent, determine ways to recruit motivated people and find ways to create a positive work environment.

For the biotech industry of each country, it is important to develop a pool of own BioEntrepreneurs and Malaysia is having a special program for that. The Malaysian biotechnology industry is well on the track to accelerate commercialization in biotechnology by 2011 as per the biotech roadmap of the country. Currently there are 135 BioNexus-status companies in Malaysia and this number is expected to increase by 50 in the next two years. These companies are expected to contribute 2.5 % to the country's gross domestic product (GDP) by 2011.

All the speakers presented their papers which impressed audience and overall there was good scientific interaction and discussions. On the whole this was a very successful international conference and all the organizers, supporting agencies and their team of committed and dedicated individuals really deserve appreciation for organizing this appealing international event.

ACKNOWLEDGEMENTS

Author's participation in BioMalaysia 2009 was fully supported by Malaysian Biotechnology Information Centre and AIMST University, Kedah, Malaysia.