



Biochar Malaysia Association

BIOCHAR MALAYSIA ASSOCIATION

REDUCE CARBON FOOTPRINT, INCREASE FOOD PRODUCTIVITY

Editor: Dr. Rosazlin Abdullah

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2016/2017

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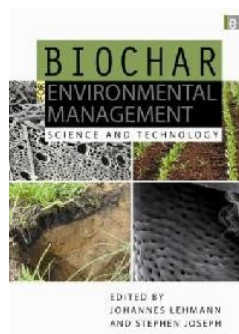
BMA TALK

'Biochar Production and Utilization: A Case study'

In conjunction with Biochar Malaysia Association (BMA)- Annual General Meeting (AGM), pre Talk was held at the Agriculture Hall, Faculty of Agriculture on Tuesday, 8th March 2016. The event was attended by various agriculture and non-agriculture institutions, industries, lecturers, researchers, communities, post and undergraduate students. The first lecture was delivered by Dato' Ng Seng Huat from Yoltan Briquette (M) Sdn. Bhd with the title of 'Biochar Production and Utilization: A Case Study'. Starting with a little bit of history about the theory and benefits of biochar, he made the audience understand and fully immersed with the talk by explaining the case study in his company, Yoltan Briquette (M) Sdn. Bhd, regarding the process and manufacturing of sawdust charcoal and how it can be used in prolong burning time. The talk was continued by the second speaker, Mrs Theeba Manickam, a research officer from MARDI on the same title but the event become more interesting as she explained on biochar utilization with a case study on different type of biochar application, characteristic and how the biochar gives benefits on soil fertility. The audience was excited and amazed with both speakers as they give a well explanations and example of case study on biochar.



Book : Biochar for Environmental Management



Edited by Johannes Lehmann and Stephen Joseph

Message from BMA President

Dear readers,

Biochar is known to some of you but maybe it's still alien to most people in Malaysia. It is basically carbon residue from partial burning of biomass. If you light up a match it will leave carbon residues after the light goes out – that is a type of biochar.

Humanity facing tough challenges ahead such as food security and climate change and biochar can contribute greatly in these two areas. The carbon residues from partial burning of biomass could contribute to negative cycle of carbon – the carbon is stored in stable solid form instead of being released back to atmosphere in gaseous form. Researcher also found that when biochar is stored in soil, it can improve its quality. Therefore we should be delighted with biochar potential contribution in our future.

As early as 2009, as I got involve in biochar production research, I have started to promote biochar in Malaysia starting with the first Biochar Malaysia Workshop. Later with help of some like-minded biochar enthusiasts Biochar Malaysia Association (BMA) was born in 2014. I was the secretary and now I am the second president. Since then we have organized a few workshops and technical visits. We make contact with more people involve in biochar from industries and get more people to get involve in biochar research. However, that is not nearly enough to attract attention of a critical number of people to get biochar in the mainstream.

So BMA is planning to get biochar into a bigger stage in Malaysia in the next few years by engaging the public and policy makers. We should not miss the boat in the national planning especially in climate change mitigation efforts. Therefore I am extremely thankful to the committee members to come up with the newsletter. Please help us getting more people aware about biochar and help in this noble cause.

As a personal effort I have applied biochar at home. In my personal experience, I found some plants that were not so healthy suddenly flourish in soil loaded with biochar. I used biochar supplied by Mr Ali Boher, a practitioner of biochar from rice husk. I hope we can get a full story from him in future newsletters. I will not do him justice if I have to describe his wonderful work myself. I attach here two photos of the biochar project at my house.



Photo 1 : This is me applying biochar to the soil



Photo 2 : The figs and mulberry trees are thriving

UPM-BMA Biochar to Community

Since the establishment of Biochar Malaysia Association (BMA), BMA has actively educating public and conducting knowledge sharing sessions with the community through the activities conducted by its members from Faculty of Agriculture, UPM.

Amongst the activities were the knowledge sharing session of biochar application in organic farming in the programme of “Pendidikan Organik untuk Pemakanan Sihat” held at Organic Unit, Ladang 16, Faculty of Agriculture, UPM on 12th November 2016. The speciality of this programme was the target community group, which was the students of age 6-12 years old.

Educating the younger generation on biochar application as soil amendments was seen crucial for a greener environment for future. Biochar with other organic soil amendments can help to restore soil conditions for its sustainability as well as improving plant growth. These organic amendments is an alternative for chemical fertilisers that can also negatively affect the environment and become hazard to human.

Other than that, biochar produced for soil application is a practical method to reduce carbon footprint through carbon sequestration in soil. This idea was also shared in demonstration on biochar varying sources and biochar uses as soil amendment, growth medium, compost formulation in organic farming, which was the most engaging programme for public who came to visit the Organic Unit, Faculty of Agriculture, UPM during the Faculty of Agriculture Open Day last 19th-20th March 2017.

Promotional activities of BMA including the membership promotional flyers were also done throughout both programmes. This social engement and knowledge sharing with communities is hope to bring new prospects of biochar production and its application as well as knowledge and technology in wider area and larger community.- [Dr. Noraini Md. Jaafar](#)



UM- Biochar Workshop

UM- Kg. Seri Cheeding, Banting, Selangor

Biochar has been highlighted across the globe because of the immense potential in green initiatives. This workshop is in conjunction with University of Malaya's 2016 Community Service Programme (UMCares) with the collaboration of Development and Security Committee (JKKK), Kampung Seri Cheeding, Banting. Being held at Kg Seri Cheeding on 1st October 2016, the aim of this workshop is to raise awareness on waste management and to encourage recycling thus fostering long-lasting lifestyle in the community. In line with the theme of Sustaining Agriculture and Environment, the main focus of this programme included converting agricultural waste to the production of Biochar that can be applied in day-to-day basis. Some activities also included in this workshop such as questionnaire distribution, colouring contest, crossword puzzle, soil weight guessing game, knowledge transfer session, posters and biochar exhibition, identification of soil colour, texture and biochar prepping demonstration. For the knowledge transfer session, all speaker graced the event by delivering interesting topic where Dr.Pozi Milow explains on environmental science in generally, Dr.Rosazlin Abdullah covers on Biochar, plant physiology by Dr.Jamilah Syafawati and microorganisms functions in agriculture by Dr.Khanom Simarani scientifically and we have a special speaker, Cik Norizan Moez that shows how community can applied all the scientific knowledge in real life through planting. The workshop was involved by the locals of Kampung Seri Cheeding, students from SK Seri Cheeding, SMK Jenjarom, Sek. Men. Sains Banting and Kelab SPAS, UM. This workshop was completed by the appearance of Associate Professor Dr. Nurhayati Zainal Abidin, the Head of Institute of Biological Science, UM in completing the opening ceremony together with En. Hassan Musman, the Head of Kg. Seri Cheeding. The highlight of the workshop was the biochar demonstration where all the audience were very curious about the process and also the kiln design. From the survey conducted, a total of 140 surveys were obtained and most of the respondents aware that the environment conditions are not in satisfying condition and need to be recovered. From the interviews, most of the workshop participant get the idea and the information on biochar which never been heard before. Sincere gratitude goes to all the committee members, speakers, volunteers, villagers, exhibitors and all participants that involved in this successful workshop. - *Dr. Rosazlin Abdullah and Ms. Nur Sa'adah Halim*



Group photo of participants during Biochar for Sustainable Agriculture and Environment Workshop

Biochar bantu lestarikan pertanian

PERTANIAN merupakan satu sektor penghasilan produk utama makanan di negara ini. Iklim dan cuaca yang panas dan lembap sepanjang tahun menjadikan negara ini sesuai dalam menghasilkan produk pertanian secara berterusan. Di samping penghasilan produk, sektor pertanian turut menghasilkan sisa yang perlu diuruskan secara baik.

Banyak langkah telah diambil untuk mengitar semula sisa pertanian antaranya termasuklah penghasilan perabot daripada batang kelapa sawit dan juga kompos. Namun, langkah ini hanya dilaksanakan oleh industri yang menjalankan pertanian berskala besar.

Lain pula bagi petani dan peladang secara kecil-kecilan, sisa pertanian ini sering kali akan dibuang atau dikumpulkan di satu tempat dan akan dibiarkan ataupun dibakar.

Secara tidak sedar, proses penguraian dan pembakaran sisa pertanian ini akan menghasilkan gas rumah hijau (GHG) yang merupakan sumber utama pemanasan global.

Bagi mengatasi masalah ini, penyelidik dari Institut Sains Biologi Universiti Malaya, Dr. Rosazlin Abdullah bersama sekumpulan pensyarah dan

pelajar telah memperkenalkan teknologi biochar kepada masyarakat melalui program Jalinan Masyarakat UMCares 2016: Projek Biochar untuk Kelestarian Pertanian dan Alam Sekitar dengan kerjasama dari JKK Kg. Seri Cheeding Banting, Selangor. Biochar merupakan arang hitam khusus yang terhasil daripada pembakaran sisa organik pertanian, penternakan dan perhutanan.

"Teknologi mengenai biochar diketengahkan sebagai salah satu penyelesaian masalah pengurusan sisa pertanian kepada komuniti. Selain menggalakkan aktiviti kitar semula, biochar juga berfungsi sebagai penambah baik kualiti tanah," katanya ketika ditemui baru-baru ini.

Pelaksanaan projek ini adalah bawah seliaan dan peruntukan dari Pusat Komuniti dan Kelestarian Universiti Malaya (UMCares).

Menurut Pengarah UMCares, Prof. Dr. Nurzulaani Khalid, projek tersebut merupakan sebahagian daripada usaha UMCares untuk membolehkan pensyarah UM berkongsi teknologi dan kepakaran dengan masyarakat.

"Saya yakin dan percaya bahawa usaha murni para penyelidik Institut Sains Biologi bersama komuniti

Kg. Seri Cheeding, Banting, Selangor dalam memperkenalkan aplikasi teknologi biochar dapat meningkatkan lagi kesedaran serta tanggungjawab untuk melestarikan alam sekitar melalui amalan kitar semula sisa tanaman," katanya juga penyelidik dari Institut Sains Biologi, UM.

Objektif utama projek ini dijalankan adalah untuk meningkatkan kesedaran mengenai pengurusan sisa dan menggalakkan aktiviti kitar semula dalam kehidupan seharian masyarakat kampung.

Projek ini juga bertujuan untuk menambah baik kualiti tanah melalui aplikasi biochar ke atas tanah dan pelaksanaan pertanian organik secara lestari dengan pengaplikasian biochar dalam skala kecil. Menerusi penghasilan dan pengaplikasian biochar, diharapkan agar dapat meningkatkan pendapatan komuniti.

Secara menyeluruhnya, projek ini dilaksanakan untuk meningkatkan kesedaran masyarakat berkaitan dengan aplikasi amalan organik dalam memupuk gaya hidup lestari.

Menurut Pengerusi JKK Kg. Seri Cheeding, lokasi projek ini dilaksanakan, Hassan Musman, projek tersebut merupakan satu usaha yang amat bermanfaat dari pelbagai aspek, antaranya dari sudut sains, ekonomi dan kelestarian alam sekitar.

"Program ini telah berjaya membimbing penduduk kampung mengenai teknik penghasilan biochar yang berasaskan bahan yang terdapat

di sekitar kampung yang mampu mendorong petani untuk mengitar semula sisa tanaman mereka," katanya.

Bagi mencapai objektif projek berkenaan, beberapa program telah dijalankan antaranya bengkel biochar, demonstrasi penghasilan biochar, penghasilan dan pengaplikasian biochar ke atas tanaman sawi hijau bersama komuniti. Bengkel biochar dan demonstrasi telah disertai lebih daripada 150 peserta melibatkan penduduk kampung, pelajar-pelajar dari SK Seri Cheeding, SMK Jenjarom, Sek. Men. Sains Banting dan kelab SPAS UM.

Ketua Penasihat Persatuan Sains dan Teknologi dari SMK Jenjarom, Masina Misnan berkata, teknologi biochar merupakan pendedahan kepada ilmu baharu yang masih ramai belum ketahui.

"Program ini sesuai terutama kepada pelajar subjek Sains dan Sains Pertanian dan juga petani dari kampung kerana ilmu baharu yang diterima boleh dipraktikkan sendiri. Dengan adanya sesi demonstrasi yang menarik, para pelajar dapat mempelajari dan memahami mengenai biochar yang disampaikan."

Teknologi penghasilan biochar yang diperkenalkan adalah menggunakan alat yang mudah dan selamat.



DR. ROSAZLIN ABDULLAH menerangkan perbezaan hasil tanaman sawi yang diletakkan biochar dan tanpa biochar kepada penduduk kampung.

Mudah, praktikal untuk penduduk

BAGI Setiausaha Kg. Seri Cheeding, Banting, Selangor, Zahir Tahar, teknologi penghasilan biochar ini adalah mudah dan praktikal untuk penduduk kampung.

"Sepanjang penglibatan saya dalam penghasilan biochar ini, saya dapati bahawa teknologi yang diperkenalkan adalah mudah untuk dihasilkan terutama sekali alat yang digunakan adalah mudah alih dan dihasilkan dari bahan kitar semula yang boleh dihasilkan sendiri," katanya.

Selain bengkel dan demonstrasi, penghasilan dan pengaplikasian biochar ke atas tanaman turut dijalankan bersama penduduk kampung secara praktikal.

Sebanyak 21 batas disediakan bagi penanaman sayur sawi menggunakan lima jenis biochar.

Menurut pendapat peserta yang terlibat, Azhar Kattan, pengenalan mengenai teknologi pertanian yang maju dengan mengekalkan konsep mesra alam adalah sangat bagus. Hal ini kerana teknik biochar yang diperkenalkan telah berjaya diuji keberkesannya terhadap pertanian dan alam sekitar.

"Pada pendapat saya, projek ini amat bagus dijalankan kerana dapat memberi pendedahan kepada orang ramai tentang kesedaran alam sekitar."

"Saya berharap generasi akan datang turut mengadakan projek sebegini. Saya juga percaya jika produk biochar dikomersialkan pasti ramai akan menggunakannya kerana kesan biochar terhadap hasil tanaman amat bagus," ujar JKK Kg. Seri Cheeding, Zainuddin Sanip pula.

Secara keseluruhannya, projek tersebut telah memberi pendedahan mengenai teknologi biochar yang telah diguna pakai oleh negara luar untuk meningkatkan kualiti tanah, hasil tanaman dan dalam masa yang sama dapat membantu menjaga alam sekitar.

Selain itu, penghasilan dan pengaplikasian biochar juga boleh dijadikan sebagai sumber pendapatan kepada komuniti Kg. Seri Cheeding.

Sebarang maklumat tambahan mengenai penyelidikan biochar ini boleh didapati melalui Dr. Rosazlin Abdullah di rosazlin@um.edu.my

PENYEDIAAN biochar bersama penduduk kampung.



Teknologi penghasilan biochar menggunakan alat yang mudah dan selamat.

Alat utama adalah tong besi daripada tong dram yang terpakai dengan rekaan yang diubah suai bersesuaian dengan konsep penghasilan biochar.

Alat ini adalah mudah untuk digunakan dan boleh diubah ke lokasi lain.

TAHUKAH ANDA?

Tempoh penyediaan biochar adalah bergantung kepada jenis sisa pertanian yang digunakan.

Biochar merupakan produk yang diperbuat daripada biojisim seperti sisa pertanian, penternakan dan perhutanan melalui proses pirolisis iaitu sisa tersebut akan dibakar dalam keadaan oksigen yang terhad (tertutup).



SAYUR sawi merupakan antara jenis tanaman yang diusahakan menggunakan biochar.

MARDI—BIORiCHAR

Biochar Based Organic Fertilizer for Environmental Sustainability and Improved Organic Crop Production

Biochar based solid organic fertilizer 'BioRiCHAR', was developed through the combination of rice husk biochar and empty fruit bunch biochar with selected high nutrient substrates and enhanced with effective microbes, zeolite and plant enzymes. The fertilizer was developed through a composting process. Biochar which is used as a fertilizer base has many advantages such as high in pH, water holding capacity, absorption and nutrient holding capacity and act as microbial carrier which enhances crop growth and yield production. Biochar addition in the developed organic fertilizer, functions mainly to hold the nutrients inside the macro and micropores and will release them slowly in the soil with the presence of water. It was found that composting process of nutrient substrates was accelerated by the addition of biochar through the increase in microbial population and faster in maturity period. Moisture content in the compost with biochar was found higher throughout the composting period as compared to compost without biochar. This helps in reducing compost leachates. Laboratory leaching test and field verification of the developed organic fertilizer showed significantly lesser leaching rates (10-15%) when compared to organic fertilizer without biochar. Higher and more sustainable crop yield production (15-20%) higher than current fertilizer practice. High surface area of biochar also helps to improve soil structure in relation to porosity (5%) after repeated applications of fertilizer in the field.



'BioRiCHAR' which has lesser leaching rates provides more available nutrients sources for crop uptake in the soil. Sufficient amount of NPK especially for fruits vegetables crops and most importantly it will be delivered to crops in a more efficient way. Application in long term is expected to improve soil physico-chemical properties such as pH, porosity and water holding capacity as well as soil microbial properties.

BioRichar organic fertilizer was launched by Deputy Minister of Agriculture Malaysia, YB Tuan Nogeh Gombek during South East Asia Vegetable Symposium 2016, organized by MARDI, VEGINET, World Vegetable Centre and EASTWESTSEED in Putrajaya Marriott (6-9 September 2016). The Symposium discussed on BioRichar as a MARDI's Research and Development technology was commercialized by GreenerEarth Intl Holding Sdn Bhd in March 2016. The company is based in Banting Selangor with fertilizer production capacity is around 2000mt/month. Up to this date, BioRichar has been successfully used as soil amendmend for fruit crops and complete fertilizer for organic vegetable crops. As with high capacity of fertilizer supply and market trend for green fertilizers, BioRichar has high potential to be an alternative organic fertilizer and soil amendmend to reduce the chemical input for agriculture cultivation and to ensure the transformation to living soil in long term. - [Theeba M, Illani Z. I, Nor Fadilah A.H and Jackson T.H.S](#)
theeba@mardi.gov.my

BIO-RiCHAR

Technology Launching During SEAVEG2016

(South East Asia Vegetable Symposium 6-9 Sep 2016 Putrajaya Marriot Hotel)

YB Tuan Nogeh Anak Gumbek and Deputy Director General MARDI



Element	%
Humic Acid	10%
Humic Sulphate	10%
Humic Potassium	10%
Humic Calcium	10%
Humic Magnesium	10%
Humic Sodium	10%
Humic Potassium	10%
Humic Calcium	10%
Humic Magnesium	10%
Humic Sodium	10%



https://www.youtube.com/watch?v=xtLJJzU29_g



FRIM- New Frontiers in New Forests Establishment on Degraded Soils

The current need to establish new areas for forest conservation has initiated the utilization of degraded and marginal soils for the establishment of forests. Most degraded areas are bound to be low in fertility and water holding capacity for the suitable establishment of forest stands. Soil ameliorations play a vital role in enhancing the potential of these areas for this initiative. Delineating the best management practices in afforestation efforts will not only garner new knowledge for forest plantation industry but also rehabilitate poor soils, provide income for local planters and increase the current conservation efforts by the country to combat global warming.

One such area that needs enrichment is BRIS (Beach Ridges Interspersed with Swales) soil. BRIS soil is usually found near shorelines and estuaries. They are formed through the deposition process of the oceanic sand and mud movement by the tidal waves. The material forming the beach ridges are predominantly sand. BRIS is well known to be sandy, very low in fertility due to the absence of clay, somewhat excessively drained, having low CEC and base saturation. Some of the common soil series which are found in BRIS are Jambu, Baging, Pauh, Rhu Tapai, and Rudua soil series.

Our current efforts in enriching the BRIS involve the utilization of biochar as a soil amendment media. Biochar is a charcoal based material that is fine textured and has many pores. It is produced through pyrolysis which is the heating of organic matter such as wood, manure, bamboo, rice husks or leaves, in a closed container in the absence/ limited oxygen at low temperatures to retain carbon. These specific conditions make biochar what it is by contributing to its special characteristics such as large surface area per unit volume as well as its ability to remain in soils with minimal biological decay. Biochar can lock up rapidly decomposing carbon in plant biomass in a much more durable form and is considered as a long term sink for reducing carbon emissions (12-84%) when its incorporated into soil. Biochar has the ability to increase plant growth, reduce nutrient leaching, increase water holding capacity and enhance microbial activity. Although the optimum application rate of biochar has not been elucidated, an informal observation of crops applied with biochar at rates between 5 and 20 percent by volume of soil has shown positive results in terms of growth.

At present, we have initiated the application of biochar with compost material and fertilizers in the planting hole of selected species such as *Shorea roxburghii* and *Calophyllum inophyllum* in BRIS area. We foresee that the incorporation of soil amendments in degraded areas may promise the successful establishment of new forests that may provide a multi-advantage forest ecosystem may it be for income generation for local people or for biodiversity augmentation and conservation purposes for the nation. - [Dr. Jeyanny V.](#) and [Dr. Wan Rasidah K.](#)



The harsh conditions of BRIS soil



Application of biochar and top soil into planting hole



Important Notice



BMA Reduce Carbon Footprint
Increase Food Productivity
Biochar Malaysia Association

BIOCHAR MALAYSIA ASSOCIATION (BMA) THIRD ANNUAL GENERAL MEETING

16th MAY 2017 (TUESDAY)

**AGRICULTURE HALL,
FACULTY OF AGRICULTURE, UPM**

- **Pre-AGM activities** (demo biochar production & application) at Organic Unit, Fac. of Agriculture, UPM
- **Pre-AGM Talk by MPOB** (Biochar: Progress, Challenges & Moving Forward)

biocharmalaysia@gmail.com

<http://biocharmalaysia.com>



<http://www.biochar-international.org/>



Contact Us

Biochar Malaysia Association

biocharmalaysia@gmail.com

Visit us on the web:

<http://biocharmalaysia.com>