



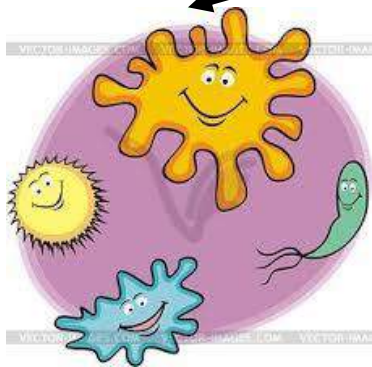
(473365-H)

Siri Baja bio IBG

Pertanian lestari melalui Bioteknologi Inovatif



Apa yang terdapat dalam tanah semula jadi?



Mikrob berfaedah



Kulat, actinomycete, serangga kecil



Bahan organik.



Mineral macro dan mikro.



Air₂

Apa yang terdapat dalam tanah semula jadi?

1. Mikroorganisma.

- Penguraian bahan organic.*
- Kitaran nutrient.*
- Pembentukan humus.*
- Pengikatan Nitrogen.*
- Membantu tumbesaran.*

2. Bahan organic.

- Sebagai sumber nutrien tumbuhan.*
- Sebagai sumber makanan untuk bacteria.*
- Memulihkan nutrien tanah.*

Apa yang terdapat dalam tanah semula jadi?

3. Nutrient makro dan mikro.

- Carbon, Hidrogen, Oksigen*
- Nitrogen*
- Fosforus*
- Kalium*
- Kalsium*
- Magnesium*
- Sulfur*
- Mangan*
- Tembaga*
- Zink*
- Molybdenum*
- Boron*
- Klorin*
- Besi*

Penting untuk tumbesaran tumbuhan, membentuk makanan dan sebagainya.

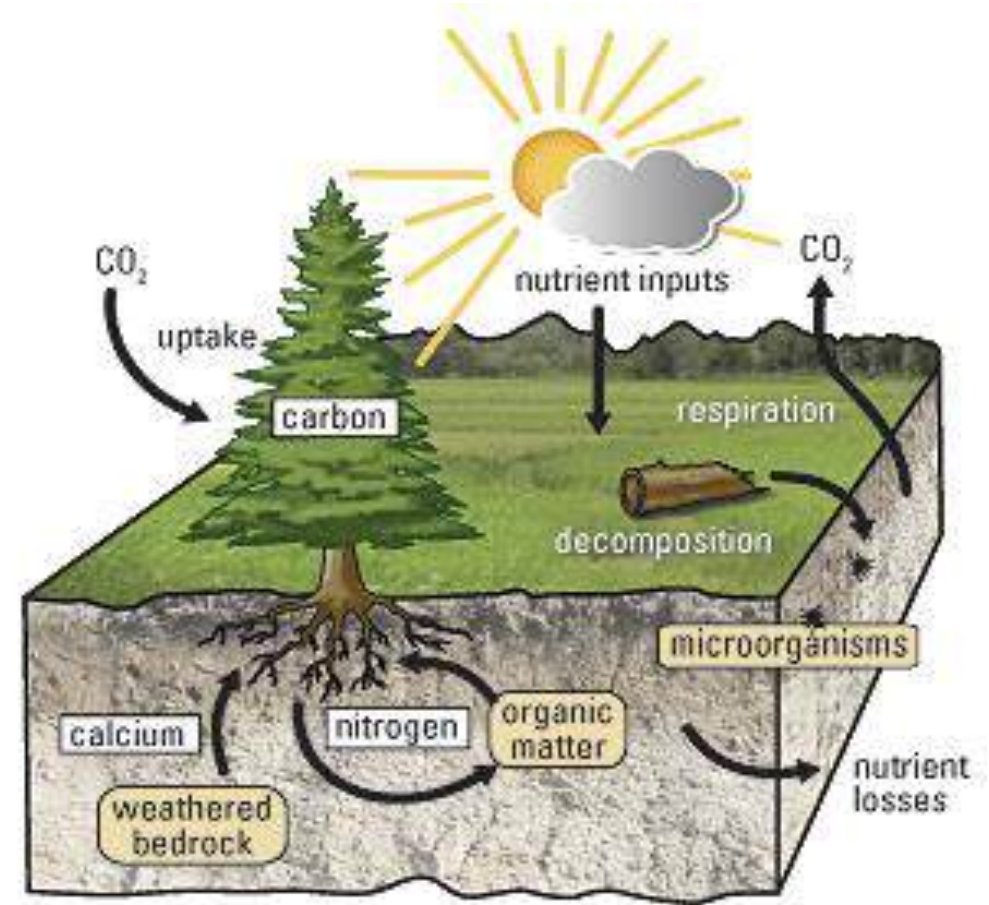
Kenapa perlindungan tanah adalah penting?

- *Tanah – memberi sumber air, nutrien, udara dan perlindungan kepada tumbuhan.*
- *Tumbuhan – memberi sumber makanan dan perlindungan kepada manusia.*
- *Manusia – tetapi manusia hanya cuma merosakkan tanah dengan baja kimia.*

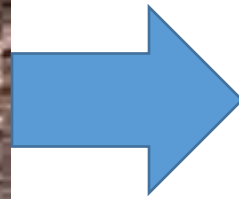
Kenapa perlindungan tanah adalah penting?

- *Apabila tanah menjadi rosak disebabkan oleh pengasidan tanah, imunitas tanah akan menjadi lemah. Tanah yang lemah tidak akan menghasilkan tanaman yang baik dan tanaman itu akan mengalami banyak penyakit. Tanaman itu tidak akan menghasilkan makanan yang berkualiti kepada manusia. Jadi pemulihan tanah dan kualiti hidup manusia adalah penting.*

Peringkat hutan dara.



Peringkat pembukaan tanah.



Keperluan baja kimia

- *Tanah mengandungi simpanan semula jadi nutrien tumbuhan, tetapi sebahagian besarnya simpanan ini adalah dalam bentuk yang tidak tersedia kepada tumbuh-tumbuhan, dan hanya sebahagian kecil dilepaskan setiap tahun melalui aktiviti biologi atau proses kimia. Proses ini adalah terlalu lambat untuk mengimbangi penyingkiran nutrien oleh pengeluaran pertanian dan untuk memenuhi keperluan tanaman.*

Kepentingan baja kimia.

- Oleh itu, baja kimia direka untuk menambah nutrien sudah ada di dalam tanah. Penggunaan baja kimia, baja organik atau biobaja mempunyai kelebihan dan kekurangannya dalam konteks bekalan nutrien, pertumbuhan tanaman dan kualiti alam sekitar.*

Kebaikan dan keburukan baja kimia.

Kebaikan.



- *Tanaman tumbuh dengan pantas dan besar.*
- *Nutrien yang mencukupi.*
- *Sokongan pertumbuhan.*
- *Meningkatkan hasil tuaian.*

Permulaan.

Kebaikan dan keburukan baja kimia.

Keburukan.

- *Ketoksikan dan pencemaran.*
- *Kerosakan tanah dan menyebabkan tanah berasid.*
- *Mengganggu ekologi tanah semula jadi.*



Penggunaan berterusan¹².

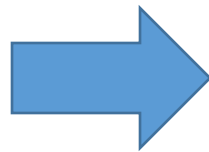
Tanah yang rusak vs tanah yang sehat.



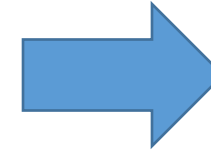
Jenis baja.



Baja kimia.



Ubat doktor.



Kesan yang cepat, tetapi banyak kelemahan.

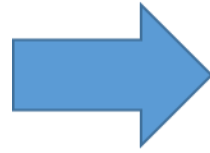
- *Penggunaan berpanjangan baja kimia = Penggunaan ubat yang berpanjangan = Walaupun cepat dan berkesan, tetapi mempunyai banyak kelemahan.*



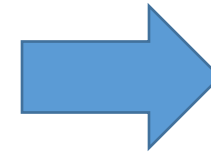
Jenis baja.



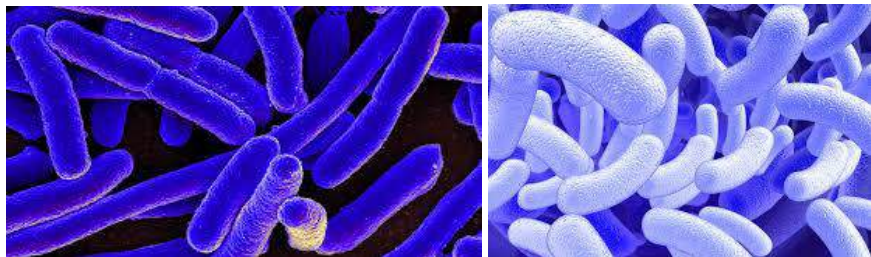
Bahan organik.



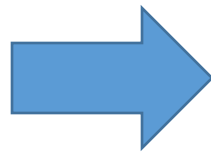
Ubat tradisional.



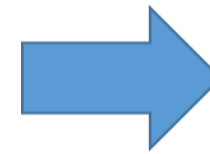
*Kesan perlahan,
tidak mempunyai
kelemahan.*



Mikrob.



Suplemen.



*Lebih selamat dan
boleh dipercayai,
penggunaan jangka
panjang dapat
membaiki dan
melindungi tanah.*

Apa itu baja bio IBG?

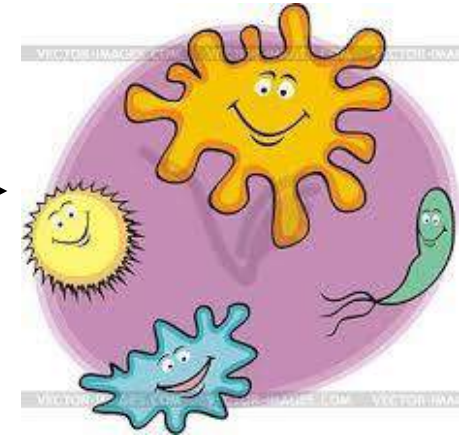


Cara yang terbaik untuk pemulihan tanah.

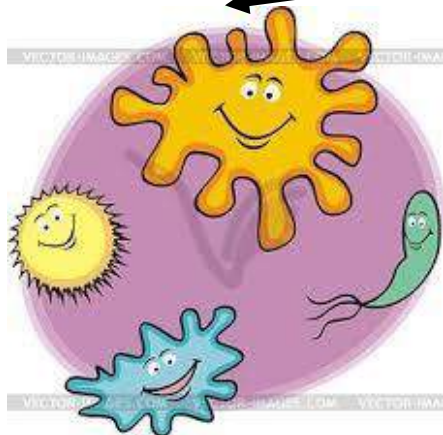
Bahan organik.



Mikrob.



Apa yang terdapat di dalam baja bio IBG?



Mikrob berfaedah tidak kurang daripada 10^7 cfu/ml.



Aloe vera, ekstrak rumpai laut, asid humik, asid amino, emulsifi ikan.

- *Baja bio dalam pasaran mesti mengandungi minimum 1 juta cfu/g bacteria untuk dikelaskan sebagai baja bio. Dengan teknologi kami, baja bio IBG telah mencapai tidak kurang daripada 10 juta cfu/g bacteria.*
- *Mikrob tidak boleh hidup bersendirian tanpa bahan organik, ia perlu dilengkapi dengan bahan organik dan nutrien makro dan mikro untuk memulihkan tanah dengan berkesan. Campuran bahan organik kami yang teratur akan membolehkan mikrob hidup di dalam tanah.*
- *Dua kombinasi ini adalah serupa dengan element dalam tanah yang semulajadi. Baja bio IBG dapat membekalkan elemen yang menyeluruh untuk tumbuhan untuk tumbuh dan menyerap lebih baik.*

IBG Manufacturing Sdn. Bhd. accredited by Standards Malaysia under accreditation number 494 for Chemical and Microbiology Tests

TEST REPORT

Customer: Production Department
IBG Manufacturing Sdn Bhd
No. 3, Jalan TPP 3,
Taman Perindustrian Putra,
47130 Puchong,
Selangor Darul Ehsan.

Lab Number : IBG-QC-02523
Date received : 10th July 2023
Date tested : 10th - 12th July 2023
Date reported : 12th July 2023


Page 1 of 1

Sample description : Liquid Biofertilizer
Sample marking : Durlan 05/07/23 MAS-F030-2307-01

Test parameter	Method	Unit	Results
Total plate count, PCA @ 37°C for 48 hours	In House Method, TM-IBG-03-001, based on AS 1766.1.3, 1991	cfu/g	1.1 x 10 ⁸
pH @ 23.0°C	In House Method, TM-IBG-02-004, based on pH meter	-	4.02
*Total Organic Matter	In House Method, TM-IBG-02-025, based on AOAC 967.05, MS 417: Part 2: 1994, Clause 3 & MS 417: Part 2: 1994, Clause 5	% ww	55.10

* Not accredited

Jumlah kiraan bakteria: 10⁷ cfu/g


LEE CROON HOONG
Senior Microbiologist
BSc (Hons) in Biomedical Science


Dr. LINDA NG YIAN YIAN
Chief Technical Officer
BSc (Hons), MSc, PhD, FMIC
(IKM No.: F/0100/1958/89/92/13)

The results reported relate only to the items tested as received.
This test report shall not be reproduced except in full without the approval of the laboratory

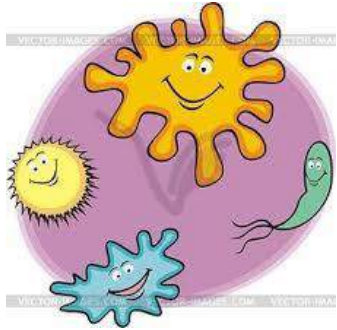
An Innovation in Biotechnology for Green World www.ibgbiofertilizer.com.my



ISO/IEC 17025



Rumusan baja bio IBG.



Mikrob berfaedah - Meningkatkan penyerapan dan mengurai bahan organik, tidak kurang daripada 10^7 cfu/ml.



Aloe vera, ekstrak rumpai laut, asid humik, asid amino, emulsifi ikan – Meningkatkan kandungan bahan organik tanah.

Aplikasi baja bio IBG.

Kadar.

70%

Baja kimia.

30%

Baja bio IBG.

Harap perhatikan bahawa baja bio IBG digunakan sebagai pengganti 30% dari baja kimia. Oleh itu, kos bahan anda tidak berubah setelah menggunakan baja bio IBG.

Mengapa pilih Baja Bio IBG

- Meningkatkan produktiviti tanaman.
- Memberi sokongan yang berdaya maju dari segi ekonomi.
- Mengekalkan kesihatan tanah.
- Berkesan dalam membantu tumbuhan untuk menyerap nutrien.
- Mengurangkan kadar baja kimia.
- Mengurangkan penyakit akar tumbuh-tumbuhan.
- Menjimatkan kapasiti stor baja.



*Seseorang yang sihat jarang
mendapat apa-apa penyakit.*



*Tanaman yang sihat jarang
mendapat apa-apa penyakit.*





Setelah 3 tahun menggunakan baja bio IBG



Selepas tanah telah dirawat dengan Baja Bio IBG, mikrob boleh membantu dalam penguraian bahan organik dan dalam mineralisasi tanah. Ia melepaskan Nitrogen dan Fosforus semasa penguraian dan dengan itu baja N dan P dapat dikurangkan.

Biofertilizers: A novel tool for agriculture

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²Rai foundations
³Padmashree Dr. D.Y. P.
⁴V.V.P. Engir
⁵Sindhu Maha
⁶Dr. D. Y. Pal

The possible role of bio-fertilizers in agriculture

Anna Marozsán¹, Szilvia Veres², Éva Gajdos², Nórr

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Chapter 1

Potential and Possible Uses of Bacterial and Fungal Biofertilizers

Francesco Gentili
Ari Jumpponen

INTRODUCTION

During the past four decades we have witnessed the doubling of the human population and a concurrent doubling of food production (Vance, 2001). Plant nutrition has played a key role in this dramatic increase in demand for and supply of food. Increases in crop production have been made possible through the use of commercial man-made fertilizers. The use of nitrogen (N) fertilizer has increased almost ninefold and phosphorus (P) more than fourfold (Vance, 2001). The tremendous increase of N and P fertilization, in addition to the introduction of highly productive and intensive agricultural systems, has allowed these developments to occur at relatively low costs (Schultz et al., 1995; Vance, 2001). The increasing use of fertilizers and highly productive systems have also created environmental problems such as deterioration of soil quality, surface water, and groundwater pollution (Schultz et al., 1995; Socolow, 1999). Environmental

RESEARCH

EFFECTS OF BIOFERTILIZERS COMBINED WITH DIFFERENT SOIL AMENDMENTS ON POTTED RICE PLANTS

Arshad Javaid^{1*}



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BIOFERTILIZER AFFECTS YIELD AND YIELD COMPONENTS OF WHEAT

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*Corresponding Author Email: mr.rostami@ut.ac.ir

ABSTRACT: In order to study effects of biological fertilizers, chemical fertilizers and bacterial growth enhancers (PGRP) on yield and yield factors of wheat (*Triticum aestivum*) and to reduce chemical fertilizers and improve soil and plant nutrition, an experiment was carried out in research field of Agriculture and Natural Resources University of Ramin, Iran in crop year of 2009-2010. The experiment was performed in split plot-factorial design arranged in a complete randomized block design with three replications. In this study, chemical factor was the base plot in three levels (Control, half of local recommended and total local recommended) and the biological fertilizer (Nitroxin and bio-phosphor) were the secondary factors with three levels (Control, 0.5 and 1 liter per hectare). Results indicate that the use of biological fertilizers lead to significant differences in grain number per spike, grain weight, biological yield and harvest index. Combined treatments of microorganisms (*Aziv* bacteria and *Pseudomonas* fluorescent) and chemical fertilizers had the greatest impact on the studied traits. Analyze of variance suggest that highest yield of grain was achieved by complete use of all three fertilizers in recommended fertilizer rate compared to control treatment. Overall, the results showed that, biological fertilizers have a significant role in improving yield and yield components of wheat, and Bio-fertilizers with chemical fertilizers may be useful to increase the yield and reduce environmental pollution.

Key words: wheat, yield, yield components, Biofertilizer.

INTRODUCTION

Given the increasing world population, more than ever feel the need to increase food production. For this purpose, four solutions (increase in area under cultivation, yield per unit area, yield per unit of time, and

While utilize Bio-fertilizers importing a large population of effective microorganisms in the active field of root system

Banyak kajian menunjukkan bahawa penggunaan baja bio membantu dalam pertumbuhan tumbuhan dan pemuliharaan tanah lestari secara keseluruhan.

Article

The Effects of Biofertilizers on Growth, Soil Fertility, and Nutrients Uptake of Oil Palm (*Elaeis Guineensis*) under Greenhouse Conditions

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 Tel.: +60-3-7967-4360 (R.A.); +60-3-8921-2020 (M.A.M.); +60-3-8924-8605 (P.L.S.)

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Abstract: The full dependency on chemical fertilizers in oil palm plantation poses an enormous threat to the ecosystem through the degradation of soil and water quality through leaching to the groundwater and contaminating the river. A greenhouse study was conducted to test the effect of combinations of biofertilizers with chemical fertilizer focusing on the soil fertility, nutrient uptake, and the growth performance of oil palms seedlings. Soils used were histosol, spodosol, oxisol, and ultisol. The three treatments were T1: 100% chemical fertilizer (NPK 12:12:17), T2: 70% chemical fertilizer + 30% biofertilizer A (CF + BFA), and T3: 70% + 30% biofertilizer B (CF + BFB). T2 and T3, respectively increased the growth of oil palm seedlings and soil nutrient status but seedlings in oxisol and ultisol under T3 had the highest in almost all parameters due to the abundance of more efficient PGPR. The height of seedlings in ultisol under T3 was 22% and 17% more than T2 and T1 respectively, with enhanced girth size, chlorophyll content, with improved nutrient uptake by the seedlings. Histosol across all treatments has a high macronutrient content suggesting that the rate of chemical fertilizer application should be revised when planting using the particular soil. With the reduction of chemical fertilizer by 25%, the combined treatment with biofertilizers could enhance the growth of the oil palm seedlings and soil nutrient properties regardless of the soil orders.

Keywords: plant growth promoting rhizobacteria; oil palm seedlings nursery; biofertilizers; chemical fertilizer

1. Introduction

The agriculture sector is considered as one of the economy pillars in many developing nations [1]. However, continuous use of agrochemicals such as chemical fertilizers and pesticides in this sector is detrimental to human health such as infant methemoglobinemia [2] and which also cause ecological imbalance [3,4]. The use of chemical fertilizer will also cause air and ground water pollution resulting

The temperature ambience was 28–33 °C. The experiments were conducted in the Complete Block Design (CBD) with four replicates for each treatment in a single trial. Liquid biofertilizer A (BFA) (effective microorganisms: 1×10^7 CFU/mL) and biofertilizer B (BFB) (effective microorganisms: 1×10^6 CFU/mL) were purchased from local Malaysian manufacturers. BFA consists of *Bacillus* spp. such as *Bacillus cereus* JCM 2152, *Bacillus anlyoliquefaciens* strain MPA 1034 and *Bacillus tequilensis* strain 10b *Lactobacillus* spp.; *Azospirillum* spp. and *Rhizobium* spp. Meanwhile, BFB consists of a very diverse group of microbes: Actinomycetes such as *Kocuria rhizophila*, *Arthrobacter methylophilus*, *Bacillus* spp. such as *B. pumilus*, *B. subtilis* (subspecies Spizizenii), *B. vallismortis*, *B. Thurengiensis*, *B. mycoides*, *B. mucilaginosus*, *Brevibacillus reuszeri*, *Paenibacillus polymax*, and *Paenibacillus azoreducens*. *Azospirillum brasilense* and fungus such as *Aspergillus niger* and *Aspergillus awamori*; yeast such as *Saccharomyces cerevisiae* Hansen were also the beneficial microbes contained in the biofertilizer. The micro and macro nutrient with the organic matter of the biofertilizers were listed in Table 2. NPK blue with the formulation ratio of (12 N:12 P₂O₅:17 K₂O: 2 MgO + TE) was used as the chemical fertilizer. The experiment consists of three treatments: [T1] 100% of CF, [T2] 70% CF + 30% BFA, and [T3] 70% CF + 30% BFB. The amount and dose of fertilizers applied was listed in Table 3. Treatments were done for four rounds (every 30 days).

Table 1. Chemical properties of histosol, spodosol, ultisol, and oxisol.

Soil Properties	Histosol	Spodosol	Ultisol	Oxisol
pH	3.23	5.49	3.83	4.33
Total N (%)	0.61	0.34	0.10	0.12
Available P (mg/kg)	75.81	36.66	25.99	32.78
Exchangeable K (mg/kg)	455.2	487.93	358.33	471.1

Table 2. The micro and macro nutrient, and the organic matter of the biofertilizer A and biofertilizer B.

Micro and Macro Nutrients	Biofertilizer A	Biofertilizer B
N	7%	5–6%
P	6%	8–9%
K	9%	10–11%
Ca	2%	-
Mg	1%	0.5–1.0%
Su	1%	-
Bo	0.5%	0.9–1.1%
Fe	50 ppm	282 ppm
Cu	15 ppm	18.4 ppm
Mn	10 ppm	35.8 ppm
Zn	15 ppm	51.4 ppm
Mo	12 ppm	-
Organic matter	Aloe vera	Aloe vera
	Seaweed extract	Seaweed extract
	Fulvic acid	Humic acid
	Amino acid	Amino acid
	Protein	Fish emulsify

Table 3. Chemical fertilizer and biofertilizer application. The biofertilizer was diluted with 200 mL of distilled water before applied to a single seedling.

Month	Control Plot		Treatment Plot	
	Dosage per Palm (g seedlings ⁻¹) (NPK 12-12-17-2 + TE)	100% Chemical Fertilizer	75% Chemical Fertilizer	Biofertilizer (mL)
1	15		10	2
2	20		15	2
3	25		20	3
4	30		25	3

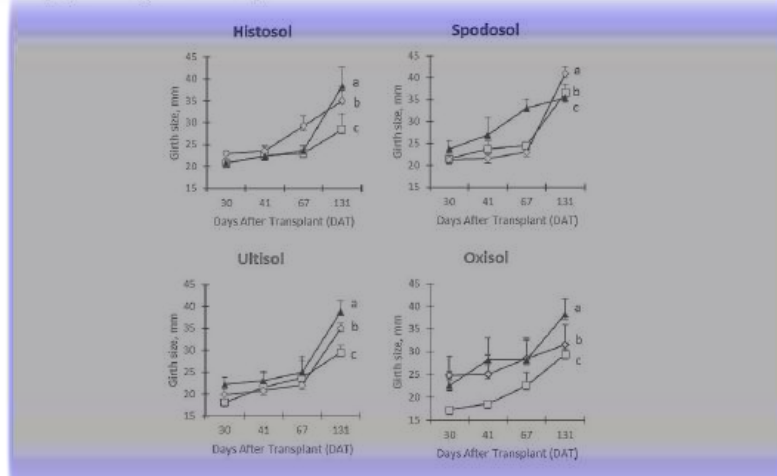
Biofertilizer B =
Baja bio IBG

T1 = 100% baja kimia

T2 = Baja bio A

T3 = Baja bio B = Baja bio IBG

Seedlings in ultisol under the same treatment reached the highest peak at 41 DAT with the chlorophyll content reading of 63.18 but decreased to 62.50 at 131 DAT. A steady increase in the chlorophyll content was seen in seedlings under oxisol but it remained the lowest reading throughout the last three months during the treatment period. The addition of biofertilizers seems also to have a positive impact on the chlorophyll reading of the seedlings.

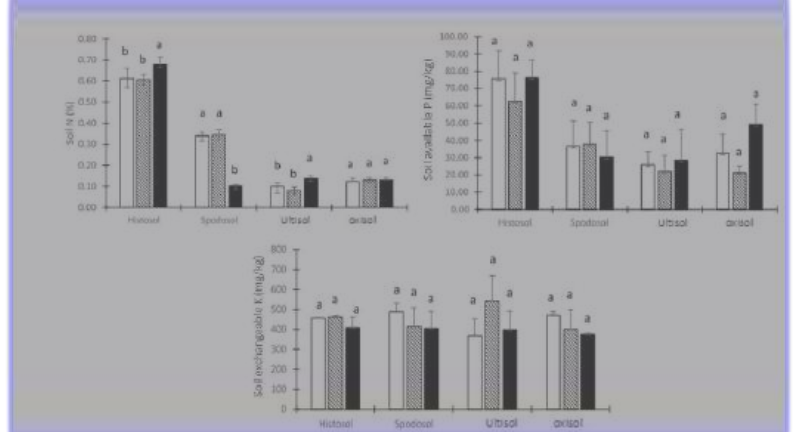


Semua anak benih dalam histosol, ultisol, dan oxisol di bawah plot T3 mempunyai ukuran lilitan tertinggi

Different letters represent significant differences in Tukey's HSD comparison. Means sharing the same letter across treatments do not differ significantly at p -value ≤ 0.05 .

Soil	Treatment	ABG	Root	Root:ABG
Histosol	T1	57.97 ± 9.92b	16.22 ± 4.46a	0.28 ± 0.03a
	T2	62.07 ± 3.47a	16.10 ± 3.31a	0.26 ± 0.04ab
	T3	59.50 ± 17.47b	15.09 ± 3.61a	0.26 ± 0.04b
Spodosol	T1	49.62 ± 14.32b	14.25 ± 4.21a	0.29 ± 0.02a
	T2	63.48 ± 7.08ab	16.52 ± 0.92a	0.26 ± 0.02ab
	T3	64.53 ± 4.99a	15.84 ± 1.17a	0.25 ± 0.02b
Ultisol	T1	53.61 ± 3.80b	11.70 ± 0.68a	0.22 ± 0.01ab
	T2	66.34 ± 2.50ab	15.20 ± 1.26a	0.23 ± 0.02a
	T3	70.39 ± 7.98a	13.92 ± 1.60a	0.20 ± 0.00b
Oxisol	T1	65.97 ± 4.61b	15.55 ± 2.95a	0.24 ± 0.06ab
	T2	58.70 ± 11.13ab	14.30 ± 1.03a	0.25 ± 0.02a
	T3	78.21 ± 14.91a	16.44 ± 0.95a	0.22 ± 0.00b

Jisim kering ABG tertinggi diperoleh dari anak benih kelapa sawit T3 dalam oxisol dan ultisol.



Kandungan nitrogen jauh lebih tinggi di semua rawatan terutamanya di petak T3.

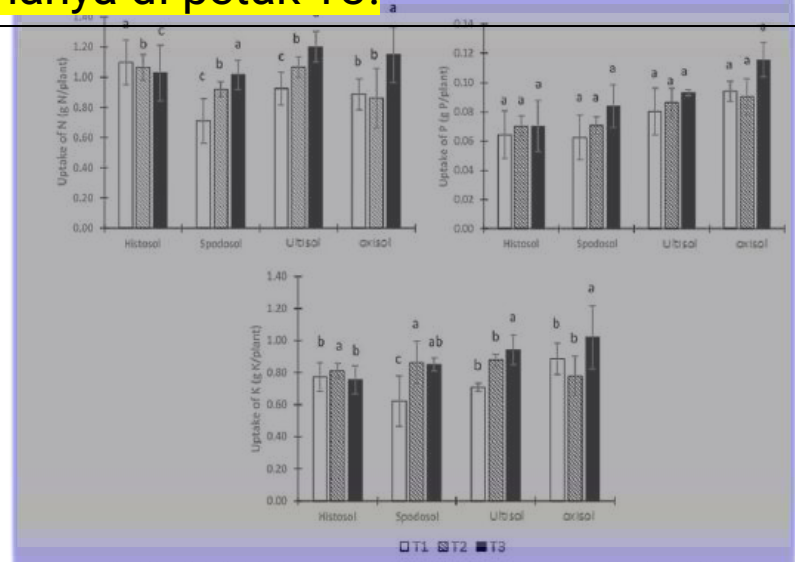


Figure 5. NPK uptake by the seedlings at time of harvest. Vertical bar represents the standard deviation. Different letters represent significant differences in Tukey's HSD comparison. Means sharing the same letter across treatments do not differ significantly at p -value ≤ 0.05 .

Secara keseluruhan, anak benih yang ditanam dalam ultisol bawah T3 mempunyai kadar penyerapan NPK tertinggi.

From the present study, the addition of biofertilizers alongside with chemical fertilizers have shown not only enhanced oil palm seedlings growth in terms of the height, girth size, and chlorophyll, it also improves the nutrient uptake of the seedlings and soil nutrient status at a reduced rate of chemical fertilizer. Reduction on the rate of the chemical fertilizer may be needed to avoid over-fertilization of the oil palm seedlings.

(Aaronn, Rosazlin A, Tau Chuan L, *et al.* (2020).

Dari kajian ini, penambahan baja bio bersama dengan baja kimia menunjukkan bukan hanya peningkatan pertumbuhan benih kelapa sawit dari segi ketinggian, saiz lilitan, dan klorofil, tetapi juga meningkatkan penyerapan nutrien anak benih dan status nutrien tanah dengan pengurangan kadar baja kimia. Pengurangan kadar baja kimia mungkin diperlukan untuk mengelakkan pembajaan anak benih kelapa sawit yang berlebihan.

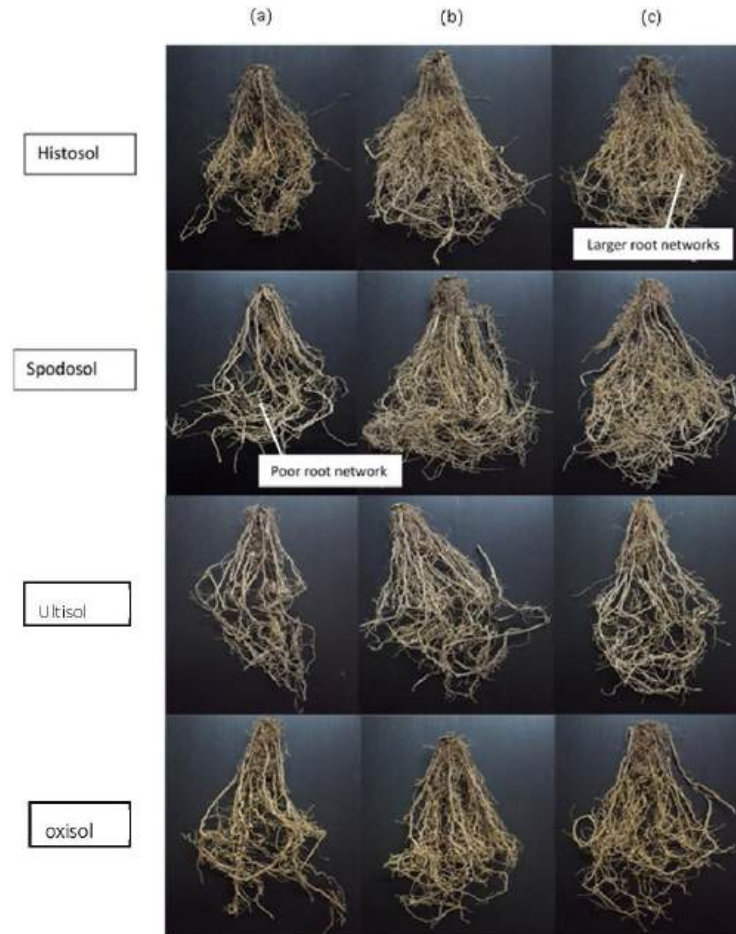


Figure 6. Roots of oil palm seedlings at the end of treatment. (a) T1, (b) T2, and (c) T3. The roots of oil palm seedlings treated with T3 were more in number, longer with more root hairs followed by seedlings in T2 then 100% T1 plots.

4. Discussion

4.1. Growth Performance of Fronds

FAO in 2011 states that about 175.5 million tons of chemical fertilizer is used in agriculture to achieve an optimum crop yield [29]. The enormous amount of chemical fertilizers deposited into soil causes a severe pollution of the river and groundwater which poses serious environmental

MEMORANDUM OF AGREEMENT

BETWEEN

MALAYSIAN PALM OIL BOARD

AND

IBG MANUFACTURING SDN BHD

ON

THE RESEARCH & DEVELOPMENT OF ENDOPHYTIC BACTERIA AS LIQUID FORMULATION FOR CONTROLLING *Ganoderma* AND OTHER PLANT DISEASES



MEMORANDUM OF AGREEMENT ON RESEARCH COLLABORATION

BETWEEN

UNIVERSITI MALAYA

AND

IBG MANUFACTURING SDN. BHD. COMPANY REGISTRATION NO.: 199801017236 (473365-H)



MEMORANDUM PERSEFAHAMAN

ANTARA

UNIVERSITI PUTRA MALAYSIA

DAN

IBG MANUFACTURING SDN. BHD. COMPANY REGISTRATION NO.: 199801017236 (473365-H)



XIAMEN UNIVERSITY MALAYSIA 厦門大學馬來西亞分校

APPROVAL ON AGREEMENT DRAFT

Project/Collaboration Title: Life Cycle Assessment for Biofertilizer to Field Application toward Carbon and Environmental Mitigation Resiliency for IBG Manufacturing Sdn. Bhd.	
Principal Investigator from XMUM: Name: Vincent Woon Kok Sin/ Tan Jian Ping School/Department: School of Energy and Chemical Engineering	
Collaborator(s): 1. [The first party, Xiamen University Malaysia] 2. [The second party, IBG Manufacturing Sdn. Bhd.]	
Project/Collaboration Duration: 36 months	Amount of Grant: RM 50,000
Commencement Date: 01/11/2023	Completion Date: 31/10/2026
Type of Document (please tick [v]):	Letter of Agreement Research Agreement <input checked="" type="checkbox"/> Memorandum of Agreement Others (please specify):

Comment(s) from Head of Department

Approved Not Approved

Justification:
Support.

Signature of Head of Department

Name: Chen Binghui
School/Department: SECE/CME
Date: 25 September 2023

Kajian-kajian lain

Tajuk	Universiti	Abstrak
<i>Elaeis guineensis</i> phenotypic traits and non-enzymatic antioxidant responses to the combination of biofertilizer and chemical fertilizer in infertile soil	UM	Gabungan 70% baja kimia dan 30% IBG biofertilizer mempunyai peningkatan 15.8% dalam pertumbuhan anak benih berbanding 100% baja kimia, dari segi pucuk segar, berat akar, dan nisbah akar-ke-pucuk yang lebih tinggi. CF70+IBG30 juga mempamerkan tahap klorofil relatif yang lebih tinggi, pengambilan B dan P yang lebih tinggi berbanding dengan baja kimia 100%. Gabungan ini juga mencatatkan tahap antioksidan tertinggi (Aaronn Avit Ajeng et al., 2024).
Metabolites profiling of humid tropic simulated <i>Bungor</i> soil under biofertilizer application	UM	Aplikasi baja bio IBG membawa kepada perubahan ketara dalam laluan metabolik utama, termasuk metabolisme Glycerophospholipid dan metabolisme asid amino, yang menunjukkan dinamik nutrien tanah yang dipertingkatkan (Aaronn Avit Ajeng et al., 2024).
Biofertilizers for Sustainable Agriculture: A Life Cycle Assessment of Upstream Manufacturing to Carbon Reduction	Xiamen University Malaysia	Pembuatan baja bio, yang dinilai melalui Penilaian Kitaran Hayat (LCA), menunjukkan pelepasan karbon yang jauh lebih rendah berbanding baja lain. Penggunaan elektrik (64.2%) ialah sumber utama pelepasan, disebabkan oleh proses intensif tenaga seperti operasi bioreaktor dan penggunaan mesin. Baja bio mengeluarkan sehingga 23.2 kali lebih rendah karbon daripada baja nitrogen, 10,666 kali lebih rendah daripada baja organik, dan 10 kali lebih rendah daripada baja bio berasaskan mikroalga. Pelepasan adalah setanding dengan baja fosforus dan kalium tetapi boleh menggantikan baja nitrogen, mengurangkan pelepasan global (Mulya et al., 2024).

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COLLABORATION AGREEMENT

BETWEEN



**MALAYSIAN AGRICULTURAL RESEARCH AND
DEVELOPMENT INSTITUTE (MARDI)**

AND

IBG MANUFACTURING SDN. BHD.

**IN RELATION TO THE DEVELOPMENT OF IBG
MULTIPURPOSE BIO FERTILIZER FOR RICE
CULTIVATION**

1

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FINAL REPORT ON

DEVELOPMENT OF IBG MULTIPURPOSE BIO FERTILIZER FOR RICE CULTIVATION



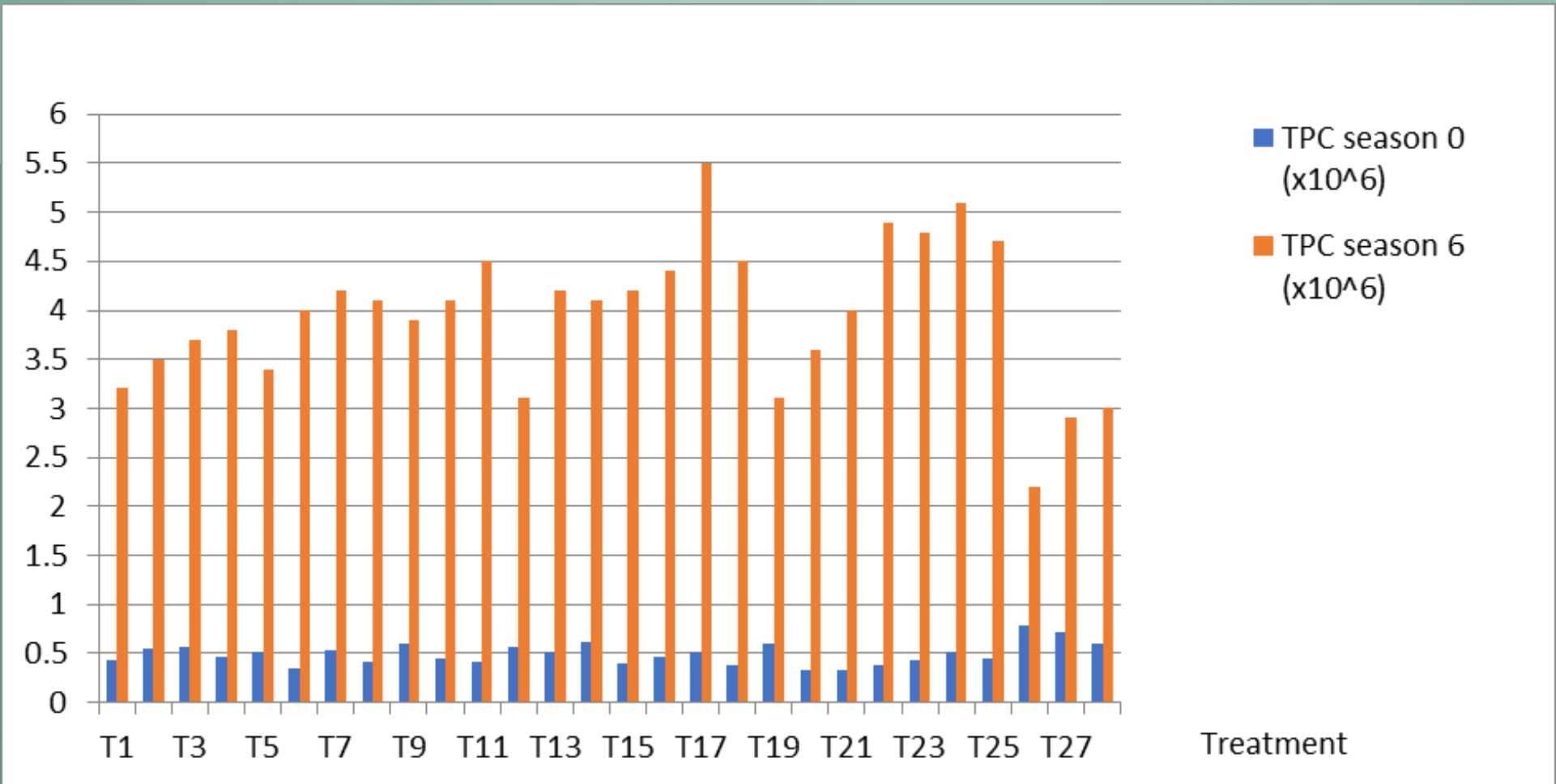
15th February 2017 – 30th May 2020 (6 Seasons)

Abstrak

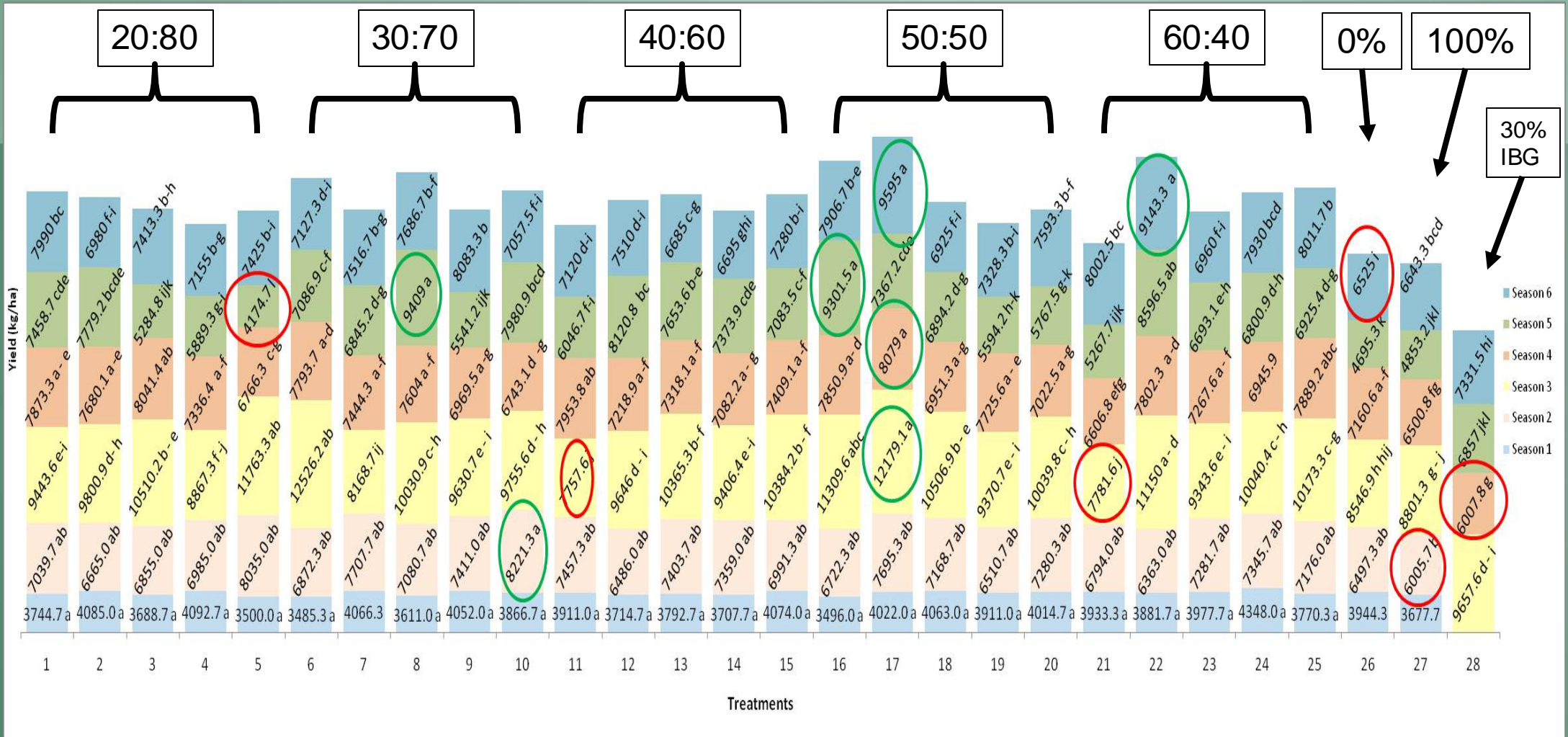
- Satu Perjanjian Kolaborasi untuk menjalankan kajian di antara MARDI dan IBG Manufacturing Sdn. Bhd. telah dimeterai pada 11 April 2017. Kajian ini dilaksanakan di MARDI Tanjong Karang selama 6 musim penanaman dalam tempoh jangkamasa 40 bulan. Objektif utama kajian ini ialah untuk menentukan kombinasi IBG Multipurpose Bio Fertilizer dan baja subsidi untuk keperluan pembajaan tanaman padi. **Dapatan kajian menunjukkan aplikasi rawatan T17 (kombinasi nisbah 50:50 (IBG:baja subsidi) dengan kadar 5 liter/ha merupakan rawatan yang terbaik kerana trend hasil yang tertinggi secara ketara pada musim 3, 4 dan 6.** Perbezaan peningkatan hasil bagi musim terakhir iaitu ke-6 adalah sebanyak 40% berbanding dengan T26 (plot kawalan tiada pembajaan). Bilangan tangkai turut dipengaruhi secara ketara oleh rawatan dan mempunyai kolerasi positif dengan hasil. Penggunaan produk IBG juga didapati turut meningkatkan populasi mikrob di dalam tanah yang turut mempengaruhi peningkatan positif terhadap nitrogen, fosforus, kalium dan konduktiviti di dalam tanah.◦

Treatments	pH (%)	Total C (%)	Total N (%)	C:N Ratio (%)	Total P (%)	Available P (%)	Exchangeable (%)				CEC (%)	Conductivity (%)
							K	Mg	Ca	Na		
T1	9.70	1.57	126.67	-55.19	581.31	1092.91	2073.68	-1.08	3.42	73.05	-0.86	2072.79
T2	13.82	-20.45	58.97	-49.96	398.77	1261.82	1418.26	23.12	2.33	56.71	-12.35	741.91
T3	10.00	-4.62	150.00	-61.85	714.79	1843.02	1587.30	-9.25	-29.12	44.08	-25.62	1745.97
T4	14.10	0.73	113.89	-52.90	575.36	2381.31	1570.99	15.47	0.83	119.89	4.46	1222.89
T5	10.92	-4.27	121.05	-56.69	510.59	1159.63	1140.35	-12.88	-40.93	11.28	-29.96	1251.22
T6	10.44	-13.33	81.82	-52.33	266.53	869.88	941.22	15.98	4.45	25.30	-11.20	373.36
T7	12.48	-9.81	128.57	-60.54	667.27	1438.54	1541.27	0.13	-5.68	81.41	-4.55	1359.66
T8	28.87	11.02	91.89	-42.14	611.53	1023.24	1466.19	24.60	87.85	89.22	-4.55	568.25
T9	-2.56	17.47	138.71	-50.79	658.46	1045.79	1355.63	42.50	-16.95	87.10	-2.04	469.23
T10	9.33	12.20	130.30	-51.28	521.93	1034.07	1199.24	0.12	-16.52	35.17	-18.95	739.53
T11	5.81	-3.97	59.46	-39.78	184.58	508.57	817.56	12.97	-11.12	55.25	1.21	922.29
T12	12.41	12.60	162.50	-57.10	520.15	1184.76	1285.14	0.00	-6.84	25.71	-2.86	960.87
T13	9.96	6.67	83.33	-41.82	482.20	958.97	709.47	0.53	-7.78	14.93	-5.62	724.38
T14	11.76	-13.08	43.90	-39.60	230.77	770.98	899.24	20.98	15.12	33.33	-16.54	421.08
T15	13.63	7.51	100.00	-46.25	399.82	747.89	827.45	-1.96	-13.13	9.52	-4.12	659.58
T16	8.57	-8.05	87.88	-51.06	358.06	1152.45	1113.49	8.09	-9.29	87.59	-10.04	1342.86
T17	8.75	-8.62	97.44	-53.72	388.42	1070.20	1433.80	-2.98	-17.30	26.50	9.55	971.57
T18	9.65	-8.93	50.00	-39.29	464.61	1608.87	1149.62	20.12	-1.34	108.00	1.82	1567.87
T19	9.16	8.08	75.00	-38.24	377.71	943.23	674.43	-3.41	-11.63	-0.78	-1.72	500.68
T20	17.51	-2.55	84.21	-47.10	638.92	1510.68	1456.35	18.29	5.57	69.72	-10.62	1085.19
T21	12.38	-2.85	81.58	-46.50	430.78	808.88	748.59	-10.40	-23.39	27.76	-3.98	633.22
T22	10.54	-8.96	75.68	-48.18	527.02	786.69	1064.29	9.79	-3.62	120.24	-19.60	1158.93
T23	17.11	0.39	102.86	-50.51	569.94	1552.84	971.62	-2.54	-3.81	47.85	-11.20	963.26
T24	11.61	-3.79	105.71	-53.23	595.70	1323.33	1452.50	14.23	-10.14	122.09	-2.18	1198.94
T25	10.17	0.35	68.42	-40.42	251.03	1134.51	1153.38	-2.01	-15.80	37.60	-8.43	845.80
T26	14.26	1.36	10.53	-8.30	43.88	135.09	-23.20	-19.71	-26.00	-18.07	8.61	-22.62
T27	0.56	-2.81	0.00	-2.81	-15.04	211.58	-32.11	-33.14	-41.56	-26.32	20.00	-42.47
T28	8.65	4.00	20.00	-13.33	56.00	66.49	-4.44	-3.74	-42.44	-3.16	6.52	-4.76
Average	10.86	-1.69	85.80	-44.93	414.99	1013.19	1069.49	4.01	-10.22	45.19	-5.88	806.40

Perubahan pH mungkin menyebabkan perubahan struktur dan fungsi mikrob yang membawa kepada pengurangan total soil carbon, total phosphate dan available phosphate. Produk yang mengandungi bakteria pengikat nitrogen memberikan peningkatan total nitrogen dan menyumbang kepada perubahan soil C:N



Kajian selama 3 tahun (6 musim) menggunakan baja bio IBG menampakkan peningkatan ketara dalam bakteria tanah. Rajah 1 menunjukkan bahawa rawatan plot mempunyai TPC yang jauh lebih tinggi daripada plot yang tidak dirawat (plot kawalan).



- Analisis gabungan musim menunjukkan bahawa tidak ada perbezaan yang ketara pada musim 1 (Jadual 8).
- Musim 2 mempunyai hasil yang ketara kerana T10 menyumbang hasil ketara tertinggi berbanding dengan kawalan.
- Trend dapat dilihat pada musim 3 dan 4 kerana T17 menyumbang kepada hasil yang paling tinggi (12.18 mt/ha dan 8.08 mt/ha). Ini menunjukkan bahawa aplikasi produk mencapai kestabilan pada musim 3.
- Pada musim 5, T16 menyumbang kepada hasil tertinggi (9.30 mt/ha). T16 kepekatannya sedikit lebih rendah berbanding dengan T17.
- Pada musim 6, T17 (9.60 mt/ha) dan T22 (9.14 mt/ha) menyumbang kepada hasil ketara tertinggi berbanding dengan T26. Perbedaannya sekurang-kurangnya 40%.



Rujukan Kami : MDI/PR2/PA/29-02
 Tarikh : 11 Disember 2020

Ketua Pegawai Eksekutif
 IBG MANUFACTURING SDN BHD
 No.3 Jalan TPP 3, Taman Perindustrian Putra,
 47130 Puchong, Selangor

UP: Dato' Yeat Siaw Ping

Melalui

Pengarah
 Pusat Penyelidikan Padi dan Beras
 Ibu Pejabat MARDI
 43400 Serdang
 Selangor Darul Ehsan


 DR. ASFALIZA BT. RAMLI
 Pengarah
 Pusat Penyelidikan Padi & Beras
 MARDI

YBrs Dato'

Laporan Akhir Projek Kolaborasi MARDI-IBG MANUFACTURING SDN BHD

Adalah dimaklumkan, surat dari pihak MARDI MDI/PR2/PA/29-02 adalah dirujuk.

2. Setelah perbincangan dan pembentangan laporan hasil kajian, dengan ini pihak MARDI telah memenuhi obligasi 6.1 dan 10.1 seperti termaktub dalam perjanjian kolaborasi bertarikh 11 April 2017 dan bersama-sama ini disertakan laporan akhir kepada pihak IBG MANUFACTURING SDN BHD.

3. Kerjasama pihak YBrs Dato' didahului dengan ucapan ribuan terima kasih



(DR. HARTINEE BINTI ABBAS)
 Timbalan Pengarah
 Program Agronomi dan Sistem Pengeluaran, (PR2)
 Pusat Penyelidikan Padi dan Beras
 MARDI Pulau Pinang

Ringkasan Laporan Kajian

Satu Perjanjian Kolaborasi untuk menjalankan kajian di antara MARDI dan IBG Manufacturing Sdn. Bhd. telah dimeterai pada 11 April 2017. Kajian ini dilaksanakan di MARDI Tanjung Karang selama 6 musim penanaman dalam tempoh jangkamasa 40 bulan. Objektif utama kajian ini ialah untuk menentukan kombinasi IBG Multipurpose Bio Fertilizer dan baja subsidi untuk keperluan pembajaan tanaman padi. Dapatan kajian menunjukkan aplikasi rawatan T17 (kombinasi nisbah 50:50 (IBG:baja subsidi) dengan kadar 5 liter/ha merupakan rawatan yang terbaik kerana trend hasil yang tertinggi secara ketara pada musim 3, 4 dan 6. Perbezaan peningkatan hasil bagi musim terakhir iaitu ke-6 adalah sebanyak 40% berbanding dengan T26 (plot kawalan tiada pembajaan). Bilangan tangkai turut dipengaruhi secara ketara oleh rawatan dan mempunyai kolerasi positif dengan hasil. Penggunaan produk IBG juga didapati turut meningkatkan populasi mikrob di dalam tanah yang turut mempengaruhi peningkatan positif terhadap nitrogen, fosforus, kalium dan konduktiviti di dalam tanah.



**PRODUCT COMMERCIALIZATION
AGREEMENT**

BETWEEN

**MALAYSIAN AGRICULTURAL RESEARCH AND
DEVELOPMENT INSTITUTE
(MARDI)**

AND

**IBG MANUFACTURING SDN. BHD.
(REG. NO.: 199801017236 (473365-H))**

IN RELATION TO THE IBG PADDY BIO FERTILIZER

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This Product Commercialization Agreement dated 8th September 2014 (hereinafter referred to as this "Agreement").



BETWEEN

MALAYSIAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE a statutory body incorporated in Malaysia under the Malaysian Agricultural Research and Development Institute Act 1969 [Act 11] and having its headquarters office at MARDI Headquarters, Persiaran MARDI-UPM, 43400 Serdang, Selangor Darul Rihsav, (hereinafter referred to as "MARDI") of the one part;

AND

IBG MANUFACTURING SDN. BHD. (Company Registration No.: 199801017236 (473365-H)) a business registered under the law of Malaysia and having its registered address at Suite 9-13A, Level 9, Wisma UOA II, Jalan Pinang, 50450, Kuala Lumpur, Wilayah Persekutuan and its business address at No. 3, Jalan TPP3, Taman Perindustrian Putra Puchong, 47130, Selangor (hereinafter referred to as "the Company") on the other part.

MARDI and the Company are hereinafter referred to as "the Parties" collectively and each as "the Party".

WHEREAS:

- A. MARDI and the Company has entered into the Collaboration Agreement in relation to the "Development of IBG Multipurpose Bio Fertilizer for Rice Cultivation" dated 11 April 2017 (hereinafter referred to as the "Collaboration Agreement"). Pursuant to Clause 13 of the Collaboration Agreement, the Parties agree that any future commercialization of IBG Multipurpose Bio Fertilizer in relation to the rice cultivation shall be formalized and secured in a separate written agreement detailing the rights and responsibilities of the Parties, including any financial commitments (if any).
- B. Pursuant to the above, the Company is desirous to produce, market, distribute and sell the IBG Multipurpose Bio Fertilizer for rice cultivation in any territory / country in the world and MARDI agrees for the Company to lead the commercialization of the IBG Multipurpose Bio Fertilizer subject to the terms and conditions as stated in this Agreement.
- C. For the purpose of the Company commercializing the IBG Multipurpose Bio Fertilizer pursuant to this Agreement, both Parties agree to name and commercialize the IBG Multipurpose Bio Fertilizer for rice cultivation as "IBG Paddy Bio Fertilizer" (hereinafter referred to as "the Product") subject to the terms and conditions hereinafter set forth in this Agreement.

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Kilang Beras Rakyat Sekinchan Sdn. Bhd.



Mei, 2022 7.84 mt/ha
November, 2022 8.27 mt/ha

RM 420 juta

...kurangkan penggunaan baja berasaskan nitrogen

Bayer bets on agro-biotech

It will jointly develop biological solutions to **use less nitrogen-based fertiliser**

BY **P J HUFFSTUTTER**

CHICAGO: Germany's Bayer AG, one of the world's biggest agricultural **chemical companies**, is joining a **US\$100 million** (RM420 million) **bet that the next big** breakthrough in crop fertilisers will be found inside a biological Petri dish.

Its Bayer LifeScience Center division, along with biotech firm Ginkgo Bioworks, is forming a start-up to focus on developing biological solutions to reduce the use of ni-

trogen-based fertiliser, or make farmers' use more efficient, company officials said this week.

The venture will be backed via a Series A investment from the two companies and hedge fund Viking Global Investors LP. The funding round closed on Wednesday. Bayer and Ginkgo Bioworks officials declined to discuss financial details or individual investment amounts.

The still unnamed business will focus on plant-based microbes, particularly finding ways for mi-

croorganisms to help plants and the soil assimilate nitrogen molecules from the air or other sources, Ginkgo Bioworks chief executive officer (CEO) Jason Kelly said in an interview.

The effort is part of a broader push in agricultural research to harness the microorganisms in plants and soil and, among other things, use them to improve crop yields or allow plants to thrive on lower amounts of fertiliser.

Reducing the amount of nitro-

gen fertiliser needed to feed plants could ease environmental concerns over water contamination from nitrogen fertiliser run-off and related greenhouse gas emissions, company officials said.

Michael Miille, a vice-president at Bayer Crop Science's biologics group, said launching this venture as a start-up was intended to keep it more nimble.

"Everything is designed for speed," said Miille, who will serve as interim CEO. — Reuters

IN BRIEF

VW CEO says has no plans to divide up the group

FRANKFURT: Volkswagen (VW) has no plans to follow local rival Daimler in considering changing the group's legal structure, its chief executive officer (CEO) said, even as the company undergoes the biggest transformation in its history. The world's largest vehicle maker by sales said on Monday it was stepping up the pace on its electric-car programme, announcing more than €20 billion (RM100 billion) of new investments over the next 12 years. Asked by reporters at the Frankfurt auto show whether he could imagine following rivals in looking at changing the group's structure, CEO Matthias Mueller said: "Others are always faster than

KELEBIHAN UNIK



1. Meningkatkan penggunaan bahan organik tanah, dengan itu mengurangkan hakisan tanah
2. Menambah baik pengangkutan nutrien melalui rembesan semulajadi akar elemen faktor pertumbuhan oleh mikroba
3. Mengurangkan kerugian yang disebabkan oleh hujan melalui bakteria Fosforus dan Kalium
4. Meningkatkan pertumbuhan tanaman
5. Meningkatkan kadar pembungaan dan nisbah bunga betina
6. Meningkatkan berat buah dan kualiti
7. Membekalkan baja nitrogen yang tidak berasid

Semua kesan di atas boleh dilihat dalam tempoh 3 bulan - 3 tahun selepas aplikasi.

IBG Manufacturing Sdn. Bhd.



IBG Manufacturing Sdn. Bhd. mempunyai kilang sendiri di Malaysia sejak 1998. Modal berbayar IBG Manufacturing adalah RM 2 juta.

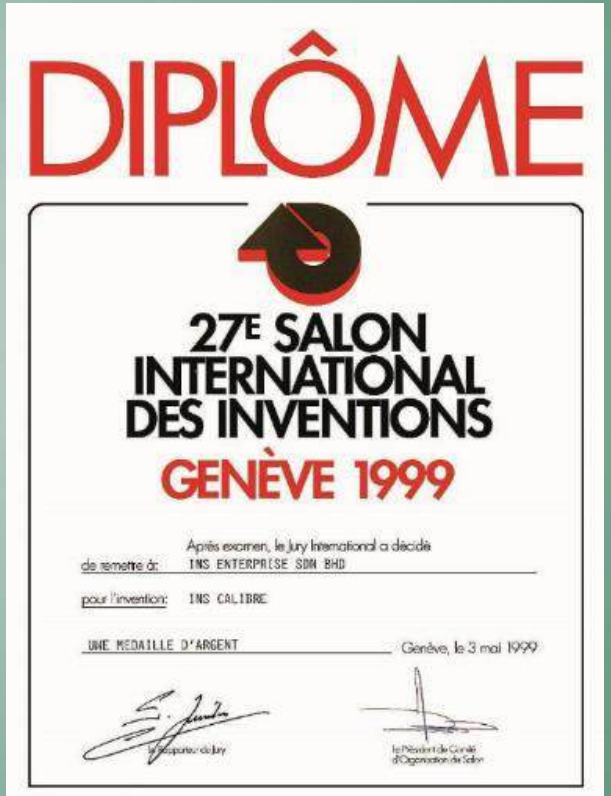
Falsafah kami :

“Innovative Biototechnology for Green world will ultimately benefit to our human kind ”

Anugerah pingat emas dalam ITEX99' (Malaysia International Invention, Innovation & Industrial Design 1999) untuk ciptaan baja bio.

Baja bio inokulan yang pertama yang mempunyai paten di Malaysia PI20062236

Anugerah pingat perak dalam 27th Geneva International Exhibition of Agricultural Invention & New Techniques 1999.





Pingat perak dalam Bio Technology Asia 2006 (3rd International Biotechnology Trade Exhibition, Conference & Awards)



ISO 9001 UKAS SGS; ISO 17025 makmal bertauliah (Untuk makmal Kimia dan Mikrobiologi).

BIONEXUS – Diperolehi daripada Malaysian Biotech Corporation – IBG disahkan sebagai pemain industri dalam zon tumpuan bioteknologi negara. Berhak menikmati 10 tahun pengecualian cukai 100%.



2011 International Standard Quality Award untuk kualiti produk



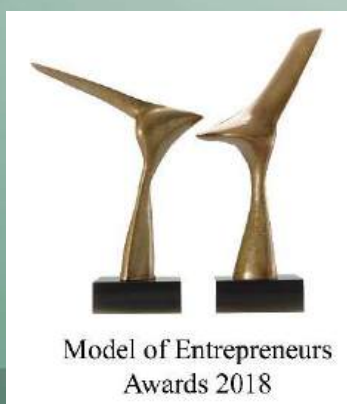
2016 Outstanding Achievers Award dalam Platinum Business Award – dalam SME Malaysia



2016 Product & Services Excellent Award dalam Sin Chew Business Excellence Award



2018 Outstanding Fertilizer Quality Product Award dalam 4th Malaysia Agro Excellence Award.



2018 Model of Entrepreneurs Awards.



2020 Philippine Halal certificate



2023 Malaysia Technology Expo Gold Award. (Kerjasama dengan MPOB)



Pembuatan dan fermentor -
disahkan dengan ISO 9001



Pembuatan dan fermentor - disahkan dengan ISO 9001



Makmal – diakreditasi dengan ISO/IEC 17025



PENYELIDIKAN DAN PEMBANGUNAN

IBG Manufacturing Sdn Bhd telah membina pusat R & D yang berteknologi tinggi untuk menyokong inisiatif R & D yang kukuh. Pusat R & D memberi tumpuan kepada teknologi terkini, daripada penyelidikan meluas kepada pembangunan produk bertaraf dunia baja bio dengan hak harta intelek milik sendiri dan potensi pemasaran yang hebat.

Kami telah menubuhkan bidang eksperimen dan kerjasama dengan institusi penyelidikan yang terkenal di Malaysia dan China sebagai usaha untuk memastikan kenaikan taraf dan inovasi produk yang berterusan.

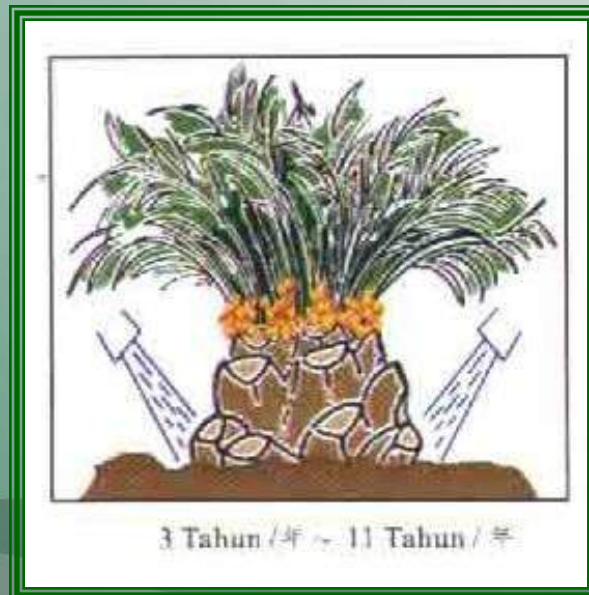


Kaedah aplikasi untuk kelapa sawit

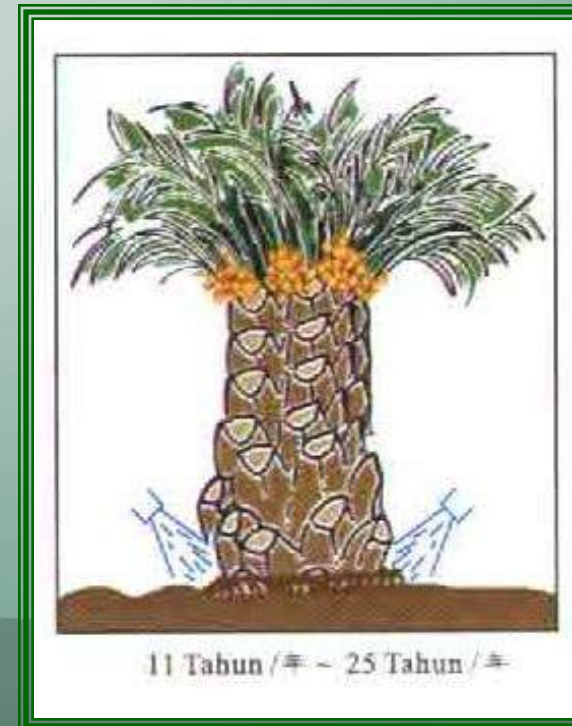
Kelapa sawit



6 bulan – 3 tahun



3 tahun – 11 tahun



11 tahun – 25 tahun

Kaedah aplikasi baja bio IBG



Analisis Kos Buruh:
Seorang pekerja 7 jam kerja dapat meliputi kira-kira 2.5 hektar (324 pokok)

Semburan akar dan batang. Pastikan semburan cukup basah pada kadar 1 lit./ pokok < Kiri dan semburan pada paras 1 kaki dari paras tanah. Semua bahagian akar atau dicalah pertemuan antara tanah dan batang pokok disemur cukup basah.
Begi Pam CKS 18 lit. semburan untuk 18 pokok sahaja.

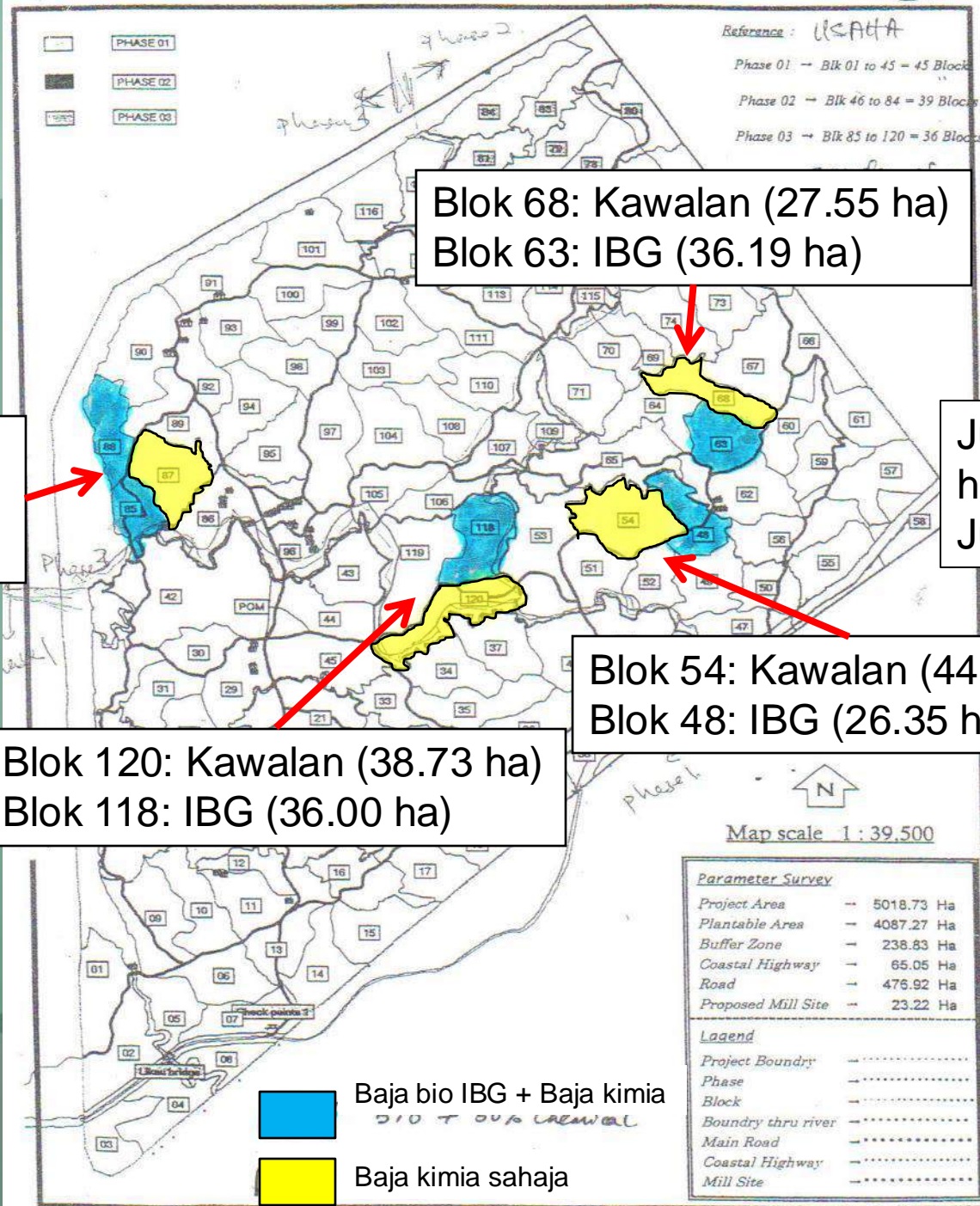


Kalibrasi dengan bekas pengukuran untuk mengukur bilangan strok untuk satu liter.

Prestasi hasil
Ladang kelapa sawit
Woodman
Aplikasi
Baja Bio IBG

Tanah Mineral Ladang Usaha Sepadan

- 4,000 hektar
- Ditanam pada 2001 - 2002
- Selang penuaian: 12 -14 hari
- Jumlah hujan: 3,200 - 3,500 mm
- Varieti tanah: tanah liat berpasir, lempung berpasir, berpasir laterit, karang hardpan dan lain-lain
- Aplikasi Baja Bio IBG sejak 2002



Blok 68: Kawalan (27.55 ha)
 Blok 63: IBG (36.19 ha)

Blok 87: Kawalan (35.83 ha)
 Blok 85 & 88: IBG (20.29 ha & 34.12 ha)

Jumlah blok Kawalan: 146.30 ha
 Jumlah blok IBG: 152.95 ha

Blok 120: Kawalan (38.73 ha)
 Blok 118: IBG (36.00 ha)

Blok 54: Kawalan (44.19 ha)
 Blok 48: IBG (26.35 ha)

Perbandingan kos antara Program Pembajaan Konvensional & Program Pembajaan Baja Bio IBG di ladang Usaha Sepadan

Baja Bio IBG (4 L)	RM 345
SOA	RM 750
RP	RM 1,550
MOP	RM 2,100
Kieserite	RM 460
Borate	RM 3,800
Urea	RM 1,400
8:8:8	RM 5,100
7:4:34	RM 2,250

Program Pembajaan Konvensional				
No.	Baja	Kadar	Kos/pokok	Kos/ha (130 pokok)
1	SOA	1.50 kg	RM 1.13	RM 146.25
	MOP	1.50 kg	RM 3.15	RM 409.50
2	RP	2.00 kg	RM 3.10	RM 403.00
3	SOA	1.50 kg	RM 1.13	RM 146.25
	MOP	1.50 kg	RM 3.15	RM 409.50
4	Kieserite	1.00 kg	RM 0.46	RM 59.80
5	Borate	0.10 kg	RM 0.38	RM 49.40
6	SOA	1.50 kg	RM 1.13	RM 146.25
	MOP	1.50 kg	RM 3.15	RM 409.50
Jumlah		12.10 kg	RM 16.77	RM 2,179.45

Program Pembajaan Baja Bio IBG				
No.	Baja	Kadar	Kos/pokok	Kos/ha (130 pokok)
1	Baja Bio IBG (4 L)	40 ml	RM 3.45	RM 448.50
2	SOA	0.75 kg	RM 0.56	RM 73.13
	MOP	2.00 kg	RM 4.20	RM 546.00
3	RP	1.30 kg	RM 2.02	RM 261.95
	Kieserite	0.70 kg	RM 0.32	RM 41.86
4	Borate	0.100 kg	RM 0.38	RM 49.40
5	SOA	0.75 kg	RM 0.56	RM 73.13
	MOP	2.00 kg	RM 4.20	RM 546.00
Jumlah		7.60 kg + 40 ml	RM 15.69	RM 2,039.96
Jumlah penjimatan kos/pokok			RM 1.07	

Data Hasil Ladang Usaha Sepadan yang Dikumpul sejak 2004 - 2007

Percubaan 1	Tarikh tanam	Pokok/ha	mt/ha				Purata
			28 - 39 bulan	40 - 51 bulan	52 - 63 bulan	64 - 75 bulan	
			2004	2005	2006	Anggaran 2007	
Rawatan (Blk 48) (26.35 ha)	1-Jun	132	8.67	12.60	19.77	25.00	
Kawalan (Blk 54) (44.19 ha)	1-Jun	135	6.75	10.43	17.97	23.00	Purata
Varians hasil			1.92	2.17	1.80	2.00	1.97
Percubaan 2	Tarikh tanam	Pokok/ha	mt/ha				Purata
			27 - 38 bulan	39 - 50 bulan	51 - 62 bulan	63 - 74 bulan	
			2004	2005	2006	Anggaran 2007	
Rawatan (Blk 63) (36.19 ha)	1-Jul	132	8.23	11.78	18.19	24.00	
Kawalan (Blk 68) (27.55 ha)	1-Jul	130	5.77	9.35	15.91	21.00	Purata
Varians hasil			2.46	2.42	2.28	3.00	2.54
Percubaan 3	Tarikh tanam	Pokok/ha	mt/ha				Purata
			25 - 29 bulan	30 - 41 bulan	42 - 53 bulan	54 - 65 bulan	
			2004 Aug - Dec	2005	2006	Anggaran 2007	
Rawatan (Blk 118) (36.00 ha)	2-Apr	114	1.88	5.55	10.48	18.00	
Kawalan (Blk 120) (38.73 ha)	2-Apr	109	1.56	4.79	9.92	16.00	Purata
Varians hasil			0.32	0.76	0.56	2.00	0.91
Percubaan 4	Tarikh tanam	Pokok/ha	mt/ha				Purata
			25 - 33 bulan	34 - 45 bulan	46 - 57 bulan	58 - 70 bulan	
			2004 April - Dec	2005	2006	Anggaran 2007	
Rawatan (Blk 85 & 88) (54.41 ha)	1-Dec	110	5.42	7.83	18.82	24.00	
Kawalan (Blk 87) (35.83 ha)	1-Dec	105	4.17	6.21	12.41	20.00	Purata
Varians hasil			1.25	1.63	6.41	4.00	3.32

Purata kenaikan: 2.19 mt/ha

IBG baja bio telah digunakan sepenuhnya pada tahun 2006, tetapi trial itu masih dikekalkan sehingga 2007.

Kesimpulan

Kawalan		
Baja	Kos/pokok	Kos/ha (130 pokok)
12.10 kg	RM 16.77	RM 2,179.45
Pusingan/tahun	Kos buruh/pusingan/ha	6 pusingan/ha
6	RM 8	RM 48
Jumlah kos/ha		RM 2,227.45

Rawatan		
Baja	Kos/pokok	Kos/ha (130 pokok)
Baja kimia 7.60 kg	RM 12.24	RM 1,591.46
IBG 40 ml	RM 3.45	RM 448.50
Pusingan/tahun	Kos buruh/pusingan/ha	5 pusingan/ha
5	RM 8	RM 40
Jumlah kos/ha		RM 2,079.96

Hasil (mt) /ha	2.19
Harga purata/mt	RM 700.00
Pendapatan	RM 1,533.00
Varians kos /ha	RM 147.49
Pendapatan tambahan /ha	RM 1,680.49

Data hasil Usaha Sepadan

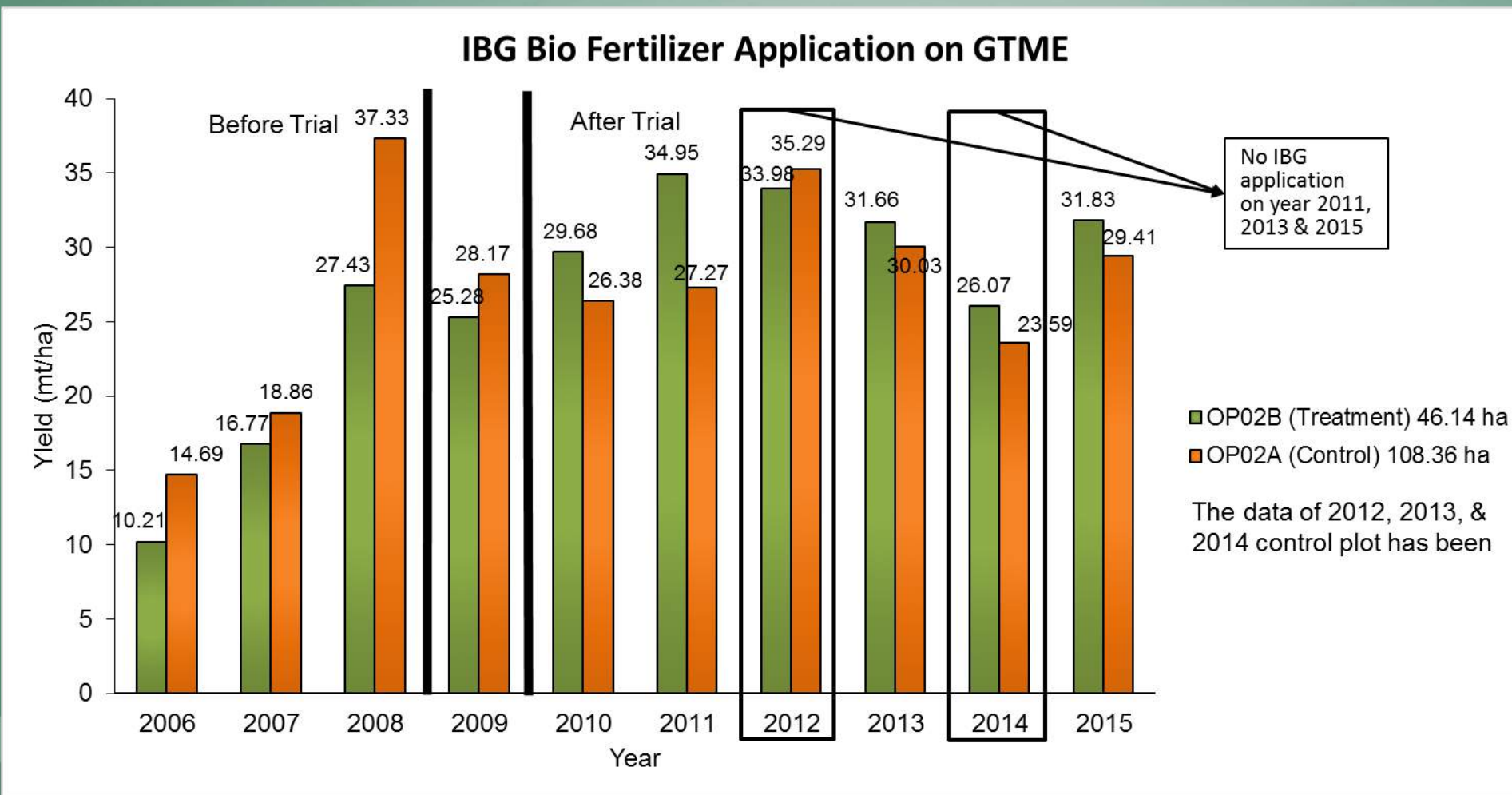
Fasa	HA	Tarikh tanam	PBT			Tandan/pokok			Hasil/HA			Hasil/130pokok		
			M05–A06	M06–A07	M07–A08	M05–A06	M06–A07	M07–A08	M05–A06	M06–A07	M07–A08	M05–A06	M06–A07	M07–A08
Fasa 1	1,591.36	Jan01 - Apr01	6.00 Kg	7.65 Kg	8.56 Kg	18.74	19.51	24.59	13.74 Mt	18.24 Mt	27.47 Mt	14.62 Mt	19.42 Mt	27.35 Mt
Fasa 2	1,302.43	Apr01 - Nov01	5.86 Kg	7.87 Kg	8.56 Kg	18.83	19.31	26.60	12.32 Mt	16.98 Mt	27.84 Mt	14.35 Mt	19.77 Mt	29.60 Mt
Fasa 3	1,193.42	Nov01 - Apr02	5.38 Kg	6.93 Kg	8.28 Kg	14.69	17.50	24.44	7.89 Mt	12.11 Mt	22.34 Mt	10.27 Mt	15.76 Mt	26.30 Mt
Jumlah	4,087.21		5.82 Kg	7.55 Kg	8.49 Kg	17.72	18.93	25.19	11.58 Mt	16.05 Mt	26.09 Mt	13.40 Mt	18.58 Mt	27.79 Mt

Aplikasi percubaan baja bio IBG IBG di ladang Usaha Sepadan telah bermula sejak tahun 2003. Sejak tahun 2003 - 2005, peningkatan hasil purata adalah 2.19 mt/ha. Pada tahun 2006, Baja Bio IBG telah di gunakan sepenuhnya di ladang.

GENTING TANAH MERAH ESTATE

- LOKASI: Tanah Merah, Johor
- HEKTAR: Plot Kawalan – 108.36 ha
Plot Rawatan – 46.14 ha
- TAHUN TANAM: 2002
- Aplikasi Baja Bio IBG sejak 2008

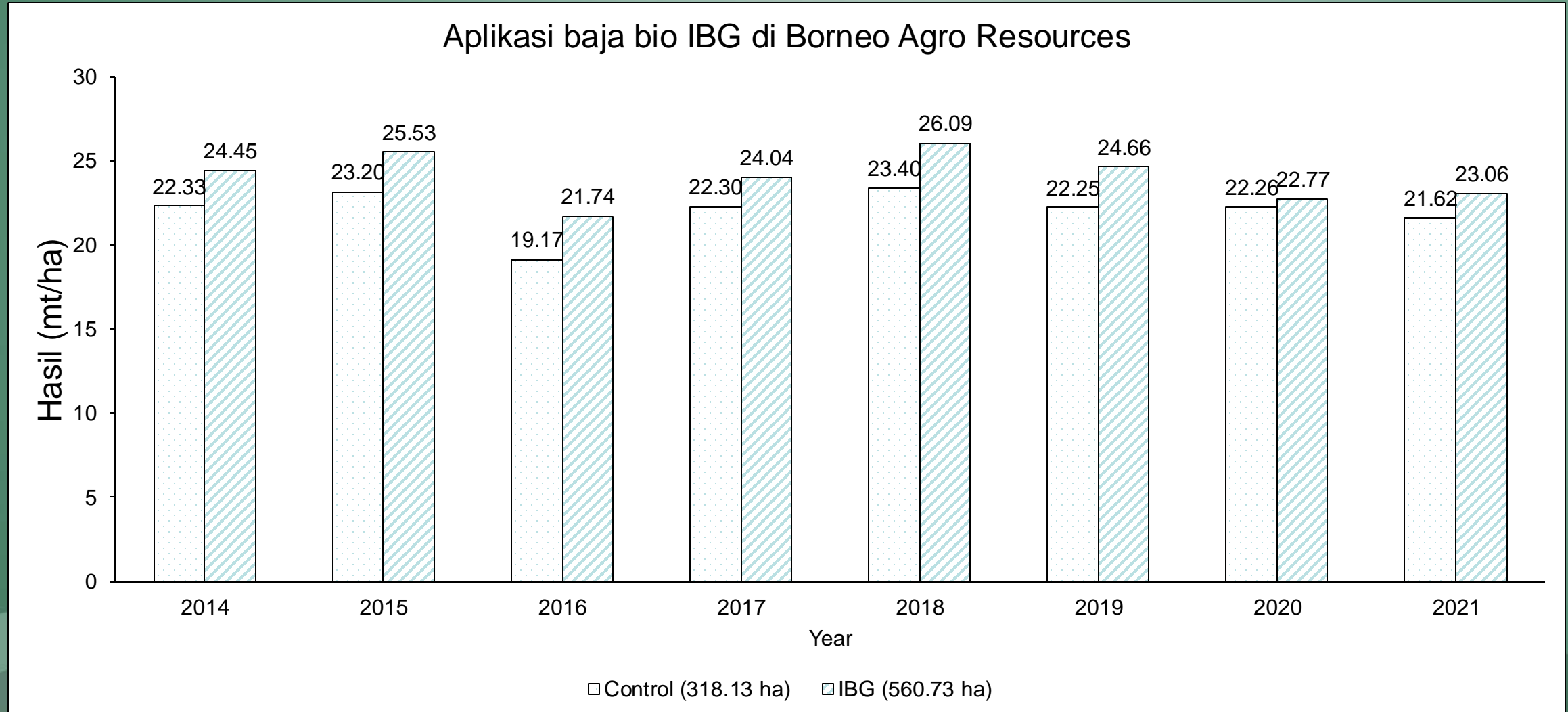
Aplikasi baja bio IBG di GTME



BORNEO AGRO RESOURCES SDN. BHD.

- LOKASI: Ladang Maskat, Bintulu, Sarawak.
- HEKTAR: Plot Kawalan: 403.63 ha – 2018; 318.13 ha - 2021
Plot Rawatan: 339.57 ha – 2018; 560.73 ha - 2021
- TAHUN TANAM: 2003 - 2005
- Aplikasi Baja Bio IBG sejak Julai 2014

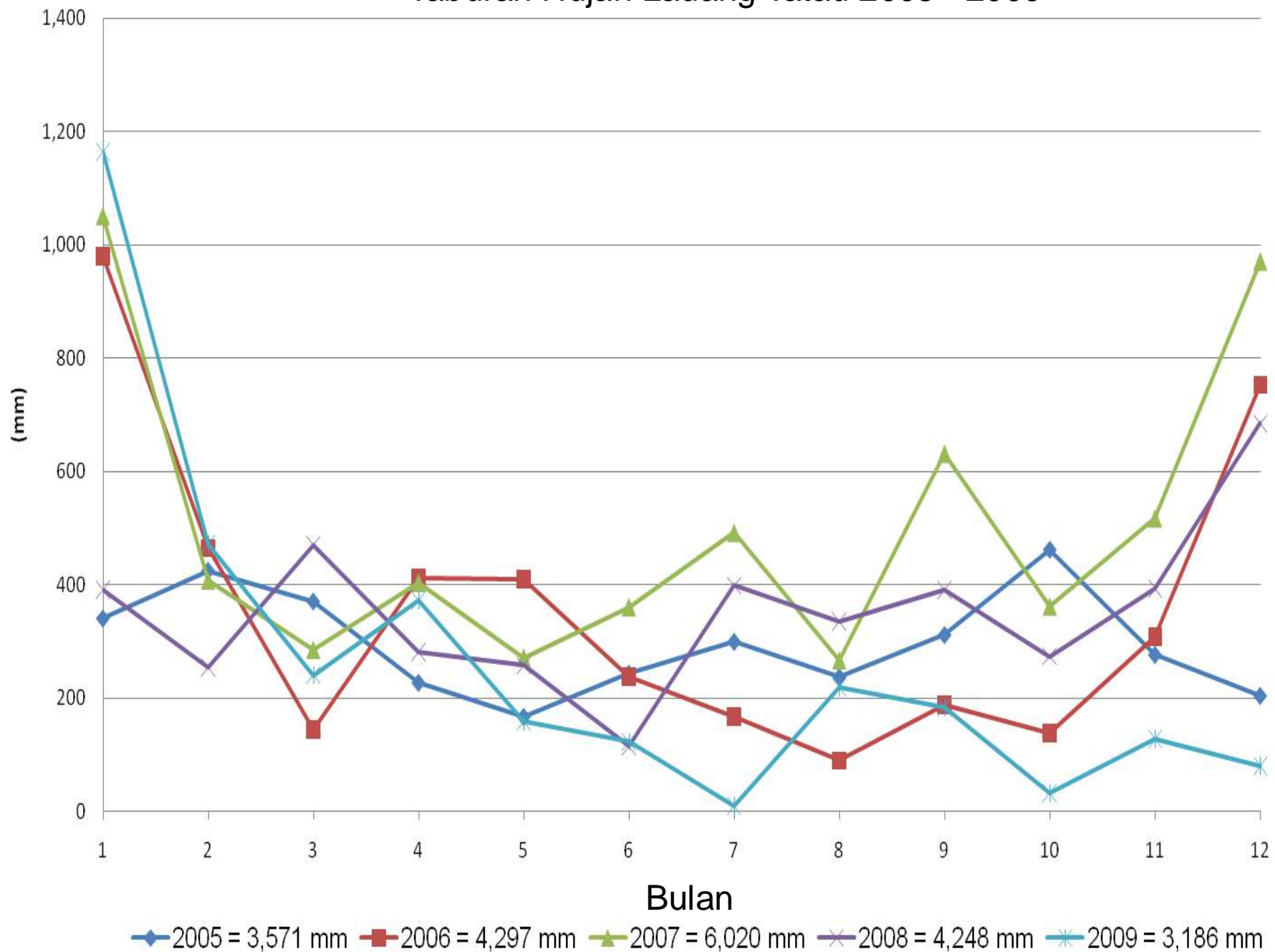
Aplikasi baja bio IBG di Borneo Agro Resources



Tanah Gambut

- Ladang Tatau (5,600 ha ditanam sejak 2004)
- Ladang Semanok (2,700 ha ditanam sejak 2004)
- Ladang Tamar (4,000 ha ditanam sejak 2001 - 2002 dengan 1,300 ha Alan Batu)
- Aplikasi Baja Bio IBG di ladang ini telah bermula pada tahun 2007 selepas menampakkan kesan yang baik dari ladang Usaha Sepadan.

Taburan Hujan Ladang Tatau 2005 - 2009



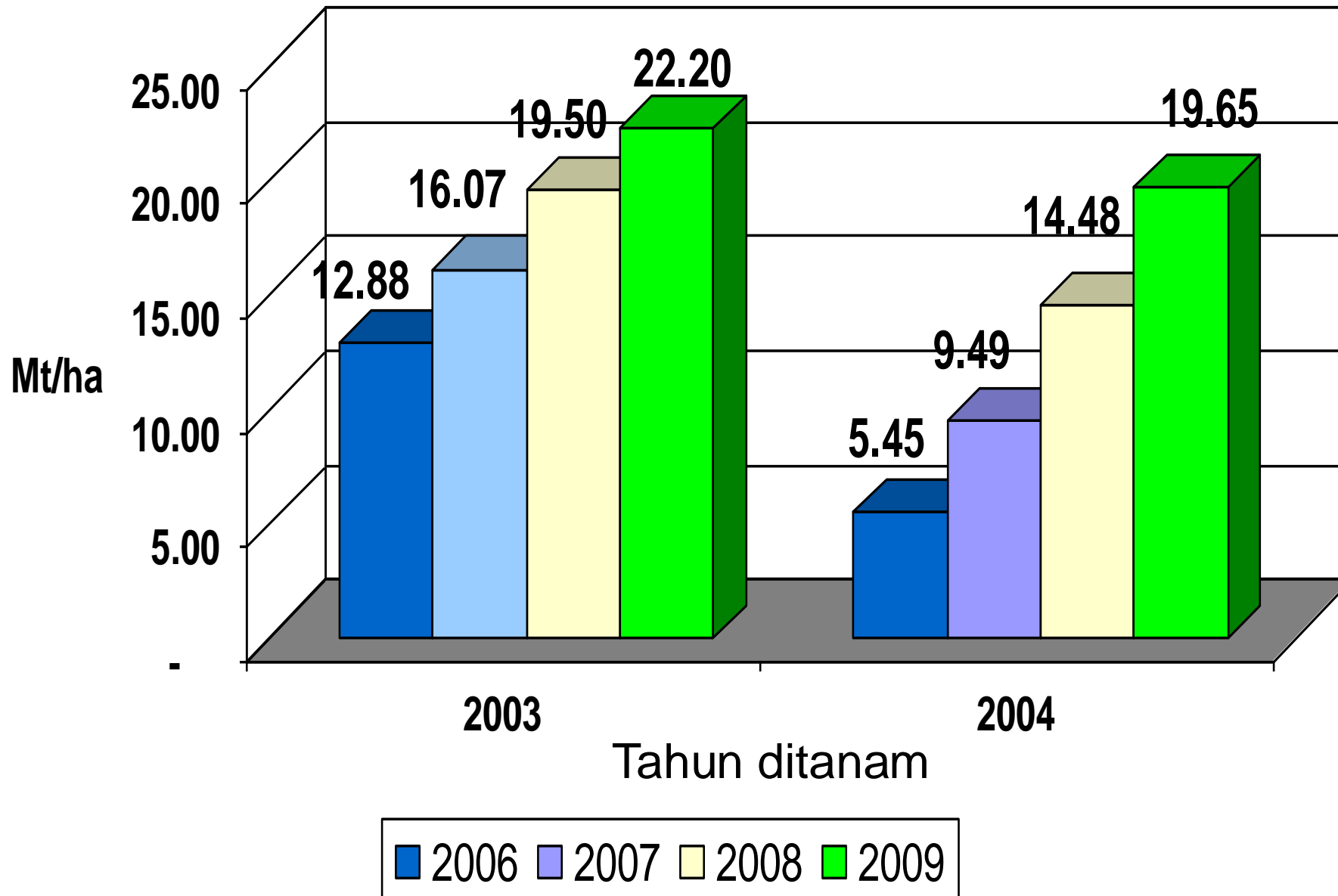
Perbandingan kos antara Program Pembajaan Konvensional & Program Baja Bio IBG Ladang Tatau

Baja Bio IBG (4 L)	RM 345
SOA	RM 750
RP	RM 1,550
MOP	RM 2,100
Kieserite	RM 460
Borate	RM 3,800
Urea	RM 1,400
8:8:8	RM 5,100
7:4:34	RM 2,250

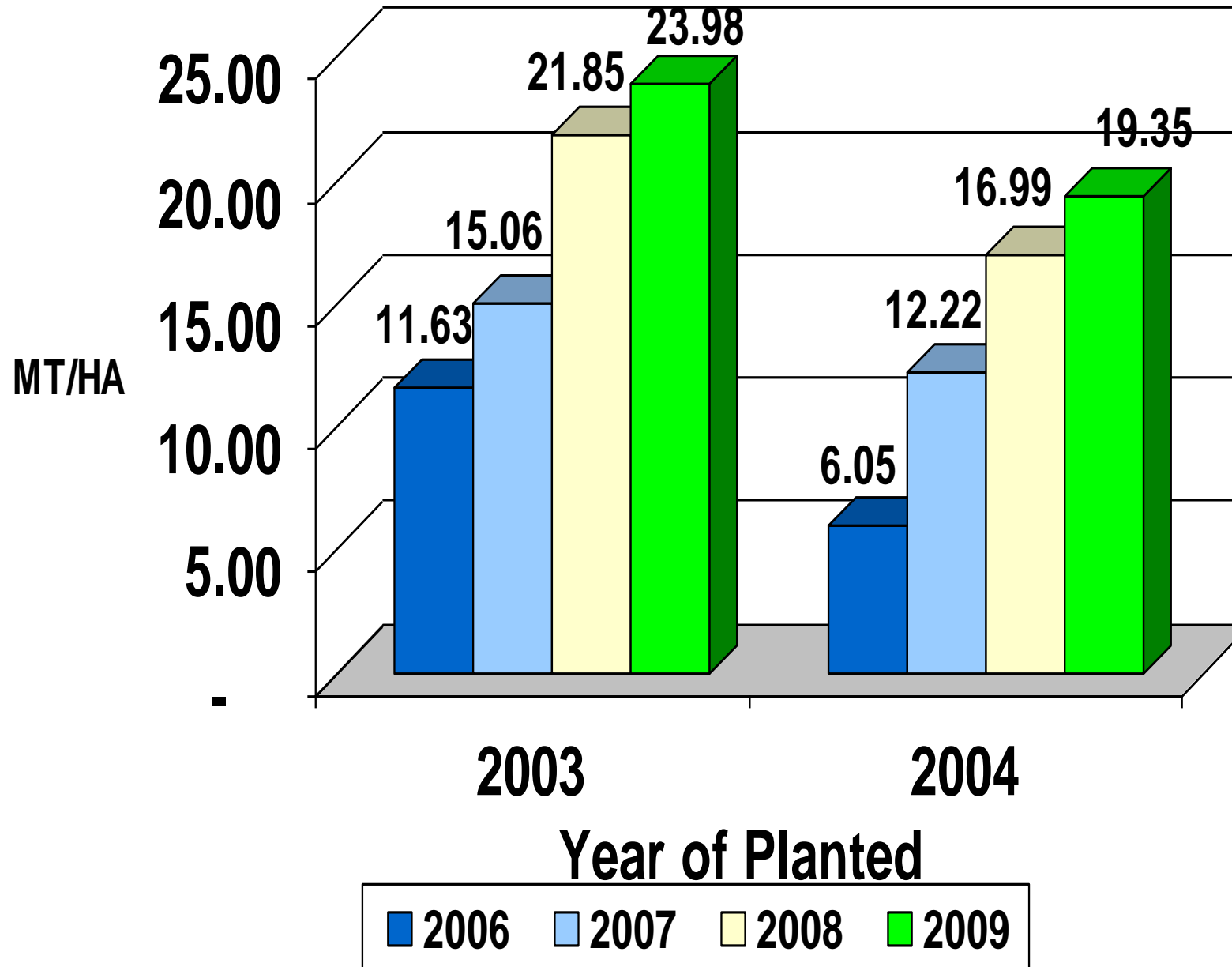
Program Pembajaan Konvensional				
No.	Baja	Kadar	Kos/pokok	Kos/ha (150 pokok)
1	Urea	0.50 kg	RM 0.70	RM 105.00
	MOP	2.00 kg	RM 4.20	RM 630.00
2	Urea	0.50 kg	RM 0.70	RM 105.00
	MOP	2.00 kg	RM 4.20	RM 630.00
3	RP	1.00 kg	RM 1.55	RM 232.50
4	ZnCu	0.125 kg	RM 0.64	RM 95.63
	Borate	0.15 kg	RM 0.57	RM 85.50
5	Urea	0.50 kg	RM 0.70	RM 105.00
	MOP	2.00 kg	RM 4.20	RM 630.00
	Jumlah	8.78 kg	RM 17.46	RM 2,618.63

Program Pembajaan Baja Bio IBG				
No.	Baja	Kadar	Kos/pokok	Kos/ha (150 pokok)
1	Packed MOP Subsoil	5.00 kg	RM 10.50	RM 1,575.00
2	Baja Bio IBG (4 L)	20 ml	RM 1.73	RM 258.75
3	ZnCu	0.125 kg	RM 0.64	RM 95.63
	Borate	0.15 kg	RM 0.57	RM 85.50
4	Baja Bio IBG (4 L)	20 ml	RM 1.73	RM 258.75
	Jumlah	5.28 kg + 40 ml	RM 15.16	RM 2,273.63
	Jumlah penjimatan kos/pokok		RM 2.30	

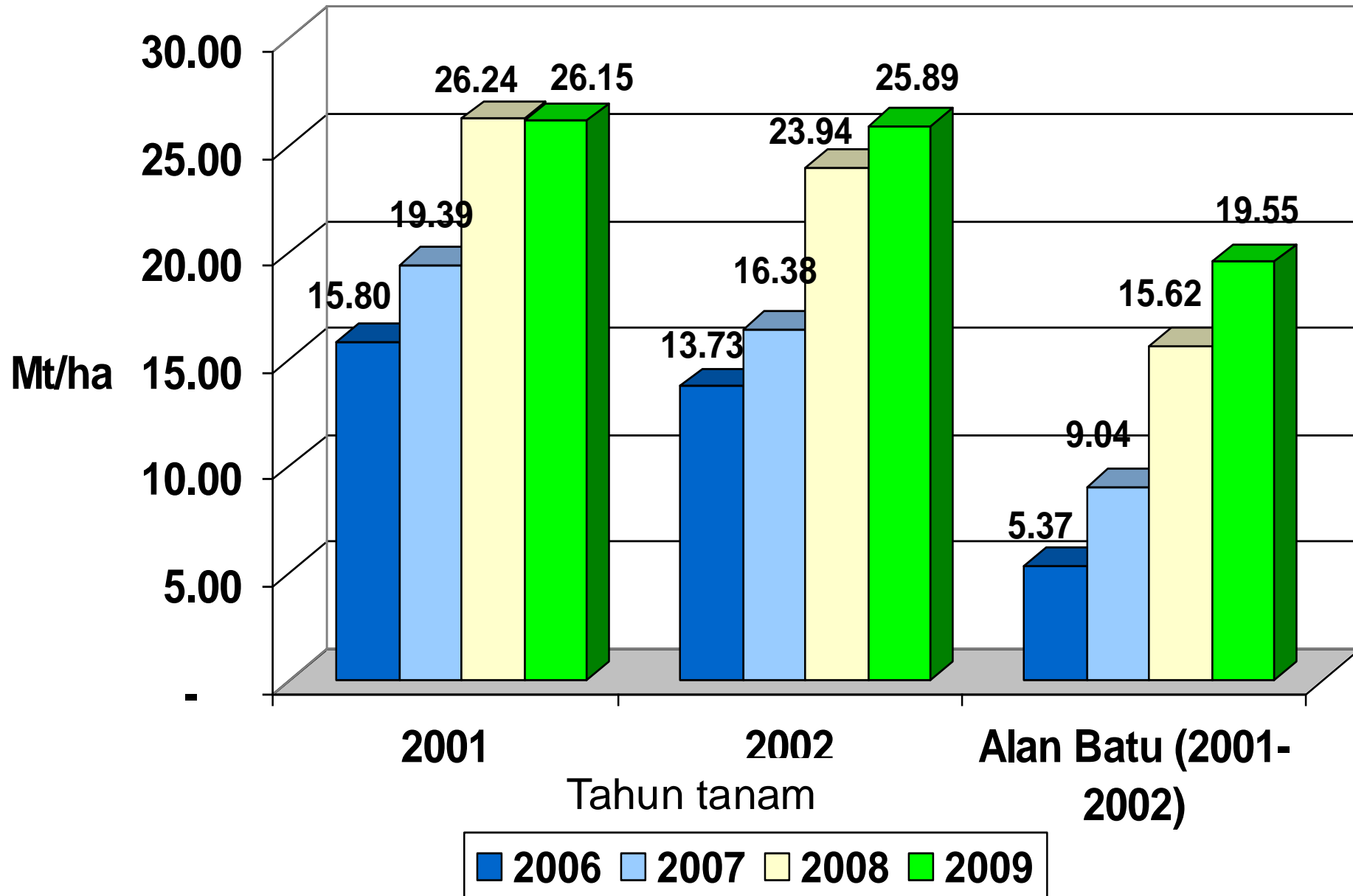
Hasil Pengeluaran Ladang Tatau 2006 - 2009



Hasil Pengeluaran Ladang Semanok 2006 - 2009



Hasil Pengeluaran Ladang Tamar 2006 - 2009



Kesimpulan

Kawalan		
Baja	Kos/pokok	Kos/ha (150 pokok)
8.78 kg	RM 17.46	RM 2,618.63
Pusingan/tahun	Kos buruh/pusingan/ha	5 pusingan/ha
5	RM 8	RM 40
Jumlah kos/ha		RM 2,658.63

Rawatan		
Baja	Kos/pokok	Kos/ha (150 pokok)
Baja kimia 5.28 kg	RM 11.71	RM 1,756.13
IBG 40 ml	RM 3.45	RM 517.50
Pusingan/tahun	Kos buruh/pusingan/ha	4 pusingan/ha
4	RM 8	RM 32.00
Jumlah kos/ha		RM 2,305.63

Hasil (mt) /ha	2.19
Harga purata/mt	RM 700.00
Pendapatan	RM 1,533.00
Varians kos /ha	RM 353.00
Pendapatan tambahan /ha	RM 1,886.00



WOODMAN KUALA BARAM ESTATE SDN. BHD.

(616631-U)

Lot 306, Jalan Krokop, P. O. Box 1437, 98008 Miri, Sarawak.
Tel: 085-419321 (8 Lines) Fax: 085-435470 / 416759 / 420145

Kami tidak teragak-agak untuk mengesyorkan mana-mana pelanggan atau syarikat untuk menggunakan produk ini yang mana ia adalah faedah bersama bagi tujuan jangka panjang

DATE : 25th May 2010

To Whom It May Concern:

This serve to certify that the IBG Microorganism Bio Fertilizers is a high technology product which Woodman Group Of Companies are using such as Usaha Sepadan Estate on mineral soil. Tamar Estate, Tatau Estate and Semanok Estate are on peat area for several years, area coverage approximately 18,000 Ha since 2003 till at present.

After using this IBG-BIO Fertilizers product, it is proven that this product really benefits us through cost saving at 20% generally, maintain and improve its productivity, reducing labour cost, improve the soil structure and maintain adequate soil moisture without extra cost where the quantity of micro-organism in the soil create healthy natural environment for the palm growth where we reduce our chemical cost at 30% generally.

We do not hesitate to recommend any clients or company to use this product where it is mutual benefit for long term purposes.

Thank you,

Yours truly,
WOODMAN KUALA BARAM ESTATE SDN. BHD.



MR. ANTHONY JAU
Senior Plantation Manager

JOBENAR RAYA SDN. BHD.

(Anak syarikat Mafrica Maytrading Sdn. Bhd.)

- LOKASI: Ladang Jobenar Raya Sdn. Bhd., Bintulu, Sarawak.
- HEKTAR: Plot Kawalan – 64.90 ha
Plot Rawatan – 91.10 ha
- SIRI TANAH: Anderson 3 (Tanah gambut mendalam)
- TAHUN TANAM: 2001
- Aplikasi baja bio IBG sejak 2006

Perbandingan hasil pengeluaran (2006 - 2008) yang dijalankan di Ladang Jobenar Raya

Plot	Jumlah Ha	mt/ha		
		2006	2007	2008
Kawalan	64.90	14.91	16.61	18.93
Rawatan	91.10	17.66	22.91	26.40
Perbezaan		2.75	6.30	7.47

Perbandingan kos antara Program Pembajaan Konvensional & Program Baja Bio IBG Ladang Jobenar Raya

Baja Bio IBG (4 L)	RM 345
SOA	RM 750
RP	RM 1,550
MOP	RM 2,100
Kieserite	RM 460
Borate	RM 3,800
Urea	RM 1,400
8:8:8	RM 5,100
7:4:34	RM 2,250

Program Pembajaan Konvensional				
No.	Baja	Kadar	Kos/pokok	Kos/ha (148 pokok)
1	7:4:34	5.00 kg	RM 11.25	RM 1,665.00
2	Urea	1.00 kg	RM 1.40	RM 207.20
3	MOP	2.00 kg	RM 4.20	RM 621.60
4	Chelated ZnCuB	0.15 kg	RM 0.77	RM 113.22
	Jumlah	8.15 kg	RM 17.62	RM 2,607.02

Program Pembajaan Baja Bio IBG				
No.	Baja	Kadar	Kos/pokok	Kos/ha (148 pokok)
1	IBG OP**	50 ml	RM 4.31	RM 638.25
2	7:4:34	3.00 kg	RM 6.75	RM 999.00
3	MOP	2.50 kg	RM 5.25	RM 777.00
4	Chelated ZnCuB	0.15 kg	RM 0.77	RM 113.22
	Jumlah	5.65 kg + 50 ml	RM 17.08	RM 2,527.47
	Jumlah penjimatan kos/pokok		RM 0.54	

Kesimpulan

Kawalan		
Baja	Kos/pokok	Kos/ha (148 pokok)
8.15 kg	RM 17.62	RM 2,607.02
Pusingan/tahun	Kos buruh/pusingan/ha	4 pusingan/ha
4	RM 8	RM 32
	Jumlah kos/ha	RM 2,639.02

Rawatan		
Baja	Kos/pokok	Kos/ha (148 pokok)
Baja kimia 5.65 kg	RM 12.77	RM 1,889.22
IBG 50 ml	RM 4.31	RM 638.25
Pusingan/tahun	Kos buruh/pusingan/ha	4 pusingan/ha
4	RM 8	32
	Jumlah kos/ha	RM 2,559.47

Hasil (mt) /ha	5.51
Harga purata/mt	RM 700.00
Pendapatan	RM 3,857.00
Varians kos /ha	RM 79.55
Pendapatan tambahan /ha	RM 3,936.55

PALM GROUP HOLDINGS SDN.BHD. (462042 - M)
(Member of Mafrica Group of Companies)
25 1-25.2, Level 25, Wisma Sanyan,
No 1, Jalan Sanyan, 96000 Sibul, Sarawak, Malaysia
Telephone: + 6084-332155 / 0198277155, Fax: + 6084-332153

28th Aug 2010

TO WHOM IT MAY CONCERN

Ladang Jobenar Raya Sdn Bhd commenced using IBG Oil Palm Bio Fertilizer combined with Chemical Fertilizer for oil palm growth and sustainable yield improvement in 2006 until now.


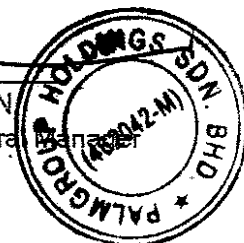
Over the past 4 1/2 years of usage of IBG Bio- Fertilizer, the average yield increase was 18.25% as compared over the control blocks

For sustainable palm oil production, integrated use of chemical and bio-fertilizer has shown to have a significant improvement in sustaining soil health through earthworm cast formation on the soil surface for oil palm production, reduction dosage of NPK by positive improvement in terms of foliar nutrients level, cost saving and good yield improvement by about 20% over the complete usage of conventional fertilizers.

Currently, our group of eight peat and mineral soils oil palm estates covering a hectare of 18,885 10 hectares is using the IBG Bio Fertilizers on a large and commercial scale.

For best results, IBG Bio-Fertilizer should be integrated with mineral fertilizers and the latter can be reduced by 20 - 30%

Yours faithfully,


CHAN WING SAN
Operations General Manager


Sepanjang 4 tahun setengah yang lalu menggunakan baja bio IBG, peningkatan hasil purata adalah 18.25% berbanding ke atas blok kawalan

Untuk hasil yang terbaik, baja bio IBG harus digunakan bersama-sama dengan baja kimia dan baja kimia tersebut boleh dikurangkan sebanyak 20-30%.

2015 Penggunaan Baja Bio IBG di MAFRICA

Syarikat	Ha ditanam	Fasa	Tahun tanam	Baja Bio IBG penggunaan/palm/tahun	Baja Bio IBG yang digunakan
Palmcol Sdn. Bhd	5,190.20	5	2007 - 2010	50 ml	6,647 botol
Jobenar Raya Sdn. Bhd.	2,832.07	4	2000, 2004 - 2005	50 ml	5,890 botol
Jobenar Balingian					1,614 botol
Rosebay Enterprise Sdn. Bhd. (Rosebay 2)	2,507.97	2	2005 - 2006	50 ml	3,574 botol
Palmraya Pelita Sikat Platation	1,736.00	2	2007 - 2010	50 ml	3,002 botol
Palmraya Pelita Meruan Plantation	4,820.07	6	2000 - 2010	50 ml	7,404 botol
Victoria Square Development Sdn. Bhd.	3,657.30	2	2008 - 2010	50 ml	2,698 botol
Saradu Plantations Sdn. Bhd	Fasa 1: 2,000 ha				4,297 botol
Worldsign Harvest Sdn. Bhd.	6,000.00				5,763 botol
Palmraya Pelita Sepapa Oya Plantation Sdn. Bhd.					1,468 botol
Titasa Sdn. Bhd.					152 botol
Jumlah	40,000.00				42,509 botol

2016 Penggunaan Baja Bio IBG di MAFRICA

Company	Ha ditanam	Fasa	Tahun tanam	Baja Bio IBG Penggunaan/palm/tahun	Baja Bio IBG yang digunakan
Palmcol Sdn. Bhd	5,190.20	5	2007 - 2010	50 ml	6,888 botol
Jobenar Raya Sdn. Bhd.	2,832.07	4	2000, 2004 - 2005	50 ml	3,440 botol
Jobenar Balingian					5,040 botol
Rosebay Enterprise Sdn. Bhd. (Rosebay 2)	2,507.97	2	2005 - 2006	50 ml	3,574 botol
Palmraya Pelita Sikat Platation	1,736.00	2	2007 - 2010	50 ml	2,880 botol
Palmraya Pelita Meruan Plantation	4,820.07	6	2000 - 2010	50 ml	7,544 botol
Victoria Square Development Sdn. Bhd.	3,657.30	2	2008 - 2010	50 ml	4,296 botol
Saradu Plantations Sdn. Bhd	Fasa 1: 2,000 ha				6,704 botol
Worldsign Harvest Sdn. Bhd.	6,000.00				7,802 botol
Palmraya Pelita Sepapa Oya Plantation Sdn. Bhd.					2,364 botol
Titasa Sdn. Bhd.					120 botol
Jumlah	40,000.00				50,152 botol

2017 Penggunaan Baja Bio IBG di MAFRICA

Company	Ha ditanam	Fasa	Tahun tanam	Baja Bio IBG penggunaan/palm/tahun	Baja Bio IBG yang digunakan
Palmcol Sdn. Bhd	5,190.20	5	2007 - 2010	50 ml	6,808 botol
Jobenar Raya Sdn. Bhd.	2,832.07	4	2000, 2004 - 2005	50 ml	4,632 botol
Jobenar Balingian					5,668 botol
Rosebay Enterprise Sdn. Bhd. (Rosebay 2)	2,507.97	2	2005 - 2006	50 ml	3,022 botol
Palmraya Pelita Sikat Platation	1,736.00	2	2007 - 2010	50 ml	3,066 botol
Palmraya Pelita Meruan Plantation	4,820.07	6	2000 - 2010	50 ml	3,792 botol
Victoria Square Development Sdn. Bhd.	3,657.30	2	2008 - 2010	50 ml	2,402 botol
Saradu Plantations Sdn. Bhd	Fasa 1: 2,000 ha				6,660 botol
Worldsign Harvest Sdn. Bhd.	6,000.00				6,836 botol
Palmraya Pelita Sepapa Oya Plantation Sdn. Bhd.					1,064 botol
Titasa Sdn. Bhd.					0 botol
Jumlah	40,000.00				43,964 botol

PRIORITY POTENTIAL SDN. BHD.

(Anak syarikat Golden Agro Sdn. Bhd.)

- LOKASI: Priority Potential estate, Mukah, Sarawak.
- HEKTAR : Plot kawalan – 156.78 ha
 Plot rawatan – 253.24 ha
- TAHUN TANAM: 2012 - 2013
- Aplikasi baja bio IBG sejak Januari 2017

Aplikasi baja bio IBG di Priority Potential

BLOCK	YOP	HA	mt/ha												Total
			Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	
K1 (Control)	Nov-12	16.00	0.34	0.20	0.40	0.30	0.27	0.57	0.80	0.81	0.76	0.78	0.74	0.82	6.78
K2 (Control)	Nov-12	15.97	0.56	0.39	0.80	0.59	0.47	0.73	1.21	1.40	1.04	1.04	1.02	1.04	10.29
K9 (Control)	Jan-13	19.97	0.34	0.28	0.39	0.42	0.49	0.86	0.69	1.20	0.83	0.99	0.92	0.93	8.35
L1 (Control)	Nov-12	23.56	0.59	0.31	0.59	0.78	0.76	1.01	1.14	1.68	1.43	1.48	1.11	1.12	12.00
L8 (Control)	Nov-12	20.00	0.39	0.28	0.30	0.55	1.31	1.03	0.72	1.31	1.20	1.48	1.06	0.72	10.33
L9 (Control)	Dec-12	20.00	0.46	0.38	0.33	0.45	1.22	0.88	0.70	0.94	1.00	1.51	0.79	1.20	9.86
L10 (Control)	Dec-12	20.00	0.48	0.36	0.34	0.44	0.78	1.44	0.73	1.48	1.07	1.18	1.99	0.91	11.20
N6A (Control)	Sep-12	6.30	0.61	0.58	0.50	0.82	0.64	1.63	1.30	2.45	1.52	1.81	1.50	0.92	14.27
N8 (Control)	Sep-12	14.98	0.65	0.51	0.39	0.62	0.60	1.40	1.29	2.23	1.67	1.39	1.50	0.73	12.98
Average			0.49	0.37	0.45	0.55	0.73	1.06	0.95	1.50	1.17	1.30	1.18	0.93	10.67
K3 (IBG)	Dec-12	15.94	0.48	0.31	0.64	0.56	0.50	0.88	1.37	1.57	1.13	1.15	1.07	1.05	10.70
K4 (IBG)	Jan-13	15.94	0.50	0.30	0.68	0.52	0.49	1.00	1.30	1.80	1.17	1.28	1.07	1.22	11.33
K5 (IBG)	Jan-13	15.90	0.46	0.28	0.65	0.67	0.68	1.06	1.57	2.11	1.20	1.24	1.16	1.28	12.36
K6 (IBG)	Jan-13	20.80	0.66	0.40	0.91	0.75	0.70	1.07	1.40	1.90	1.25	1.26	1.16	1.47	12.93
K7 (IBG)	Jan-13	20.00	0.73	0.45	1.13	1.14	1.19	2.03	1.62	2.17	1.57	1.57	1.55	1.58	16.72
K8 (IBG)	Jan-13	20.04	0.39	0.29	0.35	0.43	0.52	1.17	0.72	1.28	1.08	1.24	1.27	1.22	9.97
L2 (IBG)	Nov-12	23.56	0.89	0.82	0.95	1.12	0.99	1.26	1.42	1.42	1.52	1.78	1.18	1.31	14.65
L3 (IBG)	Nov-12	23.56	0.86	0.68	0.98	0.87	1.18	1.61	1.43	1.75	1.48	1.66	1.10	1.32	14.93
L4 (IBG)	Nov-12	23.56	0.73	0.60	0.86	0.49	1.53	1.62	1.43	1.78	1.51	1.64	1.14	1.26	14.60
L5 (IBG)	Nov-12	23.56	0.68	0.64	0.91	0.50	1.81	1.62	1.39	1.90	1.48	1.80	1.27	1.14	15.14
L6 (IBG)	Nov-12	20.00	0.58	0.53	0.74	0.45	1.52	1.36	1.32	1.97	1.50	1.71	1.34	1.26	14.28
L7 (IBG)	Nov-12	20.00	0.57	0.45	0.94	0.61	1.82	1.45	1.39	1.82	1.43	1.93	1.27	0.81	14.49
N7 (IBG)	Aug-12	10.38	0.74	0.75	0.74	1.34	1.06	1.97	1.79	2.56	1.71	1.97	1.58	0.92	17.13
Average			0.64	0.50	0.81	0.73	1.08	1.39	1.40	1.85	1.39	1.56	1.24	1.22	13.79

PHOENIX PERKS SDN. BHD.

(Anak syarikat Ngan & Ngan Holdings.)

- LOKASI : Bintulu, Sarawak.
- HEKTAR : Plot rawatan – 1,395.55 ha
- TAHUN TANAM: Pelbagai
- Aplikasi baja bio IBG sejak August 2022, kadar adalah 100 ml IBG/pokok/tahun. Aplikasi IBG standard adalah 50 ml IBG/pokok/tahun.

Year	Total mt	Total ha	Total mt/ha
2017	802.87	1,395.55	0.58
2018	10,789.06	1,395.55	7.73
2019	21,845.30	1,395.55	15.65
2020	24,975.68	1,395.55	17.90
2021	36,158.67	1,395.55	25.91
2022 (start using IBG at August - September 2022)	30,574.61	1,395.55	21.91
2023	39,227.73	1,395.55	28.11
2024 (Expected)	41,866.50	1,395.55	30.00

PHOENIX PERKS SDN. BHD.

(Anak syarikat Ngan & Ngan Holdings.)





TAMACO PLANTATION SDN. BHD.

P.O. Box 60486,
91114, Lahad Datu Sabah.

Date: 26th January 2022

To whom this may concern,

Truthfully, we have been struggling finding the right supplement for the palms to grow healthily through sustainable ways. When the IBG was introduced back in the days, the effects were seen. Result were observable might vary due to the condition and type of the soil. Make it in three years supervision, if the sustainability of the plantation is maintained, why don't we give a try proceeding its usage? It resembles a good definition of bio-friendly product that will help a lot planters to move forward with legit mission and vision.

Thank you.


Sr. Regional Manager (Sabah)
Hadrawi Mohd Arip



TAMACO PLANTATION SDN. BHD.

P.O. Box 60486,
91114, Lahad Datu Sabah.

Date: 26th January 2022

To whom this may concern,

Tamaco Plantation Sdn. Bhd. has been using IBG biofertilizer since year 2006 until now in the oil palm plantation in Bintulu and Lahad Datu with a total hecterage of about 20,000.

More than 15 years after using the IBG biofertilizer, the main effects we had seen is that the oil palm yield has been increased and maintained at 28 - 29 mt/ha when compared with non-treatment oil palm. We had witnessed the recovery and improvement of the soil's quality and structure. While our neighboring estates suffering from high infection of Ganoderma, the infection in our estate has remained low in relative, less than 2% only.

Besides, with the improvement of soil chemical and biological properties, the palm's physiology has been ameliorated. The frond pruning and bunch harvesting had become easier than before using IBG biofertilizer, thus the cost of the palm and soil's health maintenance and the cost of chemical fertilizer application has been reduced drastically. Also, it is easy to apply in the field.

These effects can only be seen after 3 months - 3 years application of IBG biofertilizer depending on the soil type condition.

Hereby, we encourage any customer or company to use this product for long term benefits.

Thank you.


Sr. Regional Manager (Sabah)
Hadrawi Mohd Arip



...20,000 ha

...15 tahun...

...28 - 29 mt/ha...

...peningkatan kualiti dan struktur tanah...Jangkitan Ganoderma kurang daripada 2%...

Kami memberi galakkan kepada mana-mana pelanggan atau syarikat untuk menggunakan produk ini untuk mendapat manfaat jangka masa panjang.

Lawatan daripada Genting Plantations Berhad



Lawatan daripada Rimbunan Hijau Group Tan Sri Datuk Sir Tiong Hiew King



1^{hb} Jun 2016, Rabu, lawatan daripada KP MARDI Datuk Dr. Sharif, KP Jabatan Pertanian Dato' Ahmad Zakaria, ahli Jemaah Pengarah NAFAS Tuan Haji Ahmad



6th Disember 2016, Selasa, lawatan daripada NAFAS
chairman Dato' Seri Saipol



Lawatan daripada Pengarah Urusan Golden Star Ace (Rimbunan Hijau Group) Mr. Kevin Ko Yeu Ying



9th Ogos 2019, Jumaat, lawatan daripada Kementerian Perusahaan Perladangan dan Komoditi



14th October 2019, Isnin, lawatan ke TAMACO bersama MPOB



9th Julai 2020, Khamis, lawatan daripada KSU Kementerian Pertanian dan Industri Makanan Dato' Zainal Azman Bin Abu Seman



13^{hb} & 27^{hb} Oktober 2021, lawatan daripada CEO MADA corp Tuan Mohamad Anuar Bin Pir Mohamad dan Pengerusi MADA YB Ahmad Tarmizi Bin Sulaiman



13^{hb} Oktober 2021, Rabu, lawatan daripada Universiti Malaya Profesor Ling Tau Chuan dan Dr. Rosazlin Abdullah



18th Oktober 2021, Isnin, lawatan daripada KP MPOB Datuk Dr. Ahmad Parveez Hj Ghulam Kadir, Pengarah Bahagian Penyelidikan Biologi Dan Kelestarian MPOB, Dr. Idris Abu Seman, Ketua Patologi Tumbuhan Dan Biosekuriti MPOB, Dr. Mohd. Hefni bin Rusli



2^{hb} November 2021, Selasa, lawatan daripada Kwantas CEO Mr. Alvin Kwan Ngen Wah, PC Mr. Sri Renganathan S. Muthiah



8th April 2022, Jumaat, lawatan daripada Menteri Pemodenan Pertanian dan Pembangunan Wilayah Sarawak, YB Dato Sri Dr. Stephen Rundi Utom



26^{hb} Julai 2022, Selasa, lawatan daripada kumpulan pengurusan tertinggi SALCRA



7th September 2022, Rabu, lawatan daripada Nottingham University Professor Dr. Lam Hon Loong



7th Oktober, Jumaat, lawatan daripada Sime Darby Plantation Research Sdn. Bhd. Dr. Sim Choon Cheak dan Dr. Teh Chee Keng



27th Oktober, Khamis, lawatan daripada United Malacca Berhad CEO Mr. Young, PC Mr. Low dan MPOB



19th Disember 2022, Isnin, Sawit Kinabalu Pengarah Urusan Kumpulan Datuk Bacho Jansie



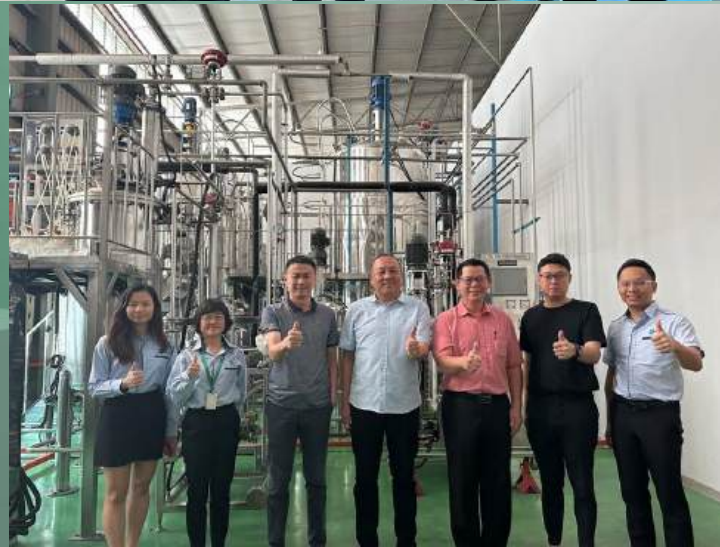
3^{hb} Januari 2023, Selasa, lawatan ke TAMACO bersama dengan Sawit Kinabalu Group MD Datuk Bacho Jansie



30th Januari 2023, Isnin, lawatan daripada Pengarah Pusat Penyelidikan Sains Tanah, Air & Baja Mardi Dr. Rosliza Binti Jajuli, Timbalan Pengarah Dr. Ganisan Krishnen, dan Pengarah Pusat Penyelidikan Padi & Beras, Dr. Mohd. Syaifudin Syaifudin Bin Abdul Rahman



3^{hb} Mei 2023, Rabu, lawatan daripada Kumpulan Yuwang



6th Jun 2023, Selasa, lawatan daripada FGV, diketuai oleh ketua agronomi & tanaman strategik, Dr. Then Kek Hoe



16th Julai 2023, Ahad, lawatan daripada Sawit Kinabalu pengawal penasihat perladangan & perniagaan tani Khairul Azhan Othman



2^{hb} Ogos 2023, Rabu, lawatan daripada KLK CEO TSDS Lee Oi Hian, pengarah perladangan kumpulan Patrick Ng, pengarah AAR Mr. Tey Seng Heng, timbalan Dr. Tasren



19^{hb} Oktober 2023, Khamis, lawatan daripada FGV Fertilizer , diketuai oleh CEO En. Hamdan



12th Januari 2024, Jumaat, lawatan daripada IOI Group MD dan CEO Dato' Lee Yeow Chor



19^{hb} Januari 2024, Friday, lawatan daripada pengurusan tertinggi IOI Research



7th Februari 2024, Jumaat, lawatan daripada FIC Supplies (Cabang perdagangan Felda) Ir. Ts Adzharulnizzam Alwi



26^{hb} Februari 2024, Isnin, lawatan daripada pengurusan tertinggi Sawit Kinabalu



27th February 2024, Selasa, lawatan daripada SDPRC ketua pegawai R&D Dr. David Ross



18^{hb} – 20^{hb} Mac 2024, Isnin - Rabu, lawatan ke IOI Gemencheh, Paya Lang, dan Bahau



28^{hb} Mac 2024, Khamis, lawatan ke UMB diketuai oleh Timbalan Menteri YB Datuk Chan Foong Hin Kementerian Perlindungan Dan Komoditi dengan MPOB



3rd April 2024, Rabu, lawatan daripada Timbalan Menteri YB Datuk Chan Foong Hin Kementerian Perlindungan Perladangan Dan Komoditi



6th Jun 2024, Khamis, lawatan daripada bahagian perkhidmatan makmal, Jabatan Pertanian



20 – 21^{hb} Ogos 2024, Selasa - Rabu, lawatan ke Sawit Kinabalu Mawao and Langkon



21^{hb} Ogos 2024, Rabu, lawatan ke KLRK Batu Lintang





Terima kasih

IBG Manufacturing Sdn. Bhd.

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