

**EFFECTS OF BIO-SOIL AMENDMENT ON
GROWTH AND YIELD OF OKRA
(*Abelmoschus esculentus* L.
Moench)**



PERPUSTAKAAN
UNIVERSITI MALAYSIA SABAH

RINA BINTI SINGKINA

UNIVERSITI MALAYSIA SABAH

**FACULTY OF SUSTAINABLE AGRICULTURE
UNIVERSITI MALAYSIA SABAH
2018**

**EFFECTS OF BIO-SOIL AMENDMENT ON
GROWTH AND YIELD OF OKRA
(*Abelmoschus esculentus*
L. Moench)**

RINA BINTI SINGKINA



**THIS IS SUBMITTED IN PARTIAL FULFILLMENT
FOR THE DEGREE OF MASTER OF
AGRICULTURAL SCIENCE**

**FACULTY OF SUSTAINABLE AGRICULTURE
UNIVERSITI MALAYSIA SABAH
2018**

ABSTRACT

This study was conducted from December 2015 until November 2016 at the Faculty of Sustainable Agriculture, University Malaysia Sabah in Sandakan. Field experiments (Experiment 1 and Experiment 3) were carried out in the research plot area under a rain shelter size and Experiment 2 was carried out in the laboratory to evaluate the effects of bio-soil amendment on growth and yield of okra (*Abelmoschus esculentus* L. Moench). The design used was Randomized Complete Block Design (RCBD) for all experiments, replicated and repeated five times in all possible factorial combinations. Results showed no significant difference in number of leaves for Experiment 1, germination percentage for Experiment 2 and days to 50% flowering in Experiment 3. Other parameters were significantly at par. Application of bio-soil amendment from 0 to 200ppm the Experiment 1 at 80 DAS for growth parameter has significantly increased in plant height (68.50 cm), plant stem diameter (1.45 cm) and leaf area (747.12 cm²). Significant interactions were observed on variety and bio-soil amendment on pod length (12.12 cm), pod weight (10.08 g), number of pod per plant (45.33), fresh weight (197.58 g) and dry weight (107.79 g) respectively. 551 F1 Hybrid Okra named Green Torpedo variety significantly gave statistics at par on pod yield (4405.91 tons/ha). In Experiment 2, two study were carried out. The first was done to evaluate the effect of different rates of bio-soil amendment on germination. The second experiment was designed to investigate the effect of different rates of bio-soil amendment on seedling emergence. The highest germination was recorded with T6 (88.67%) and average mean of the germination time was lowest at T6 (3.00 days). Experiment 3, consist six levels of bio-soil amendment, which is T1-0.0ppm as a control (water application), T2-50ppm, T3-100ppm, T4-200ppm, T5-400ppm and T6-800ppm. At 81 DAS, there was significant growth in parameter such as plant height (100.19 cm), number of leaves (46.93), plant stem diameter (1.88 cm), leaf area (702.31 cm²), fresh weight (546.72 g/plant) and dry weight (178.49 g/plant). Significant responses were observed on yield parameter such as pod length (11.73 cm), pod diameter (1.64 cm), pod weight (13.76 g), number of pods (32.53/plant) and yield 10.16 tons/ha. A highly significant and positive correlation were obtained between okra fruit yield and plant height, number of leaves per plant, stem diameter and total pods per plant. Regression analysis that has been carried out indicates that bio-soil amendment rate resulted quadratic response in Experiment 3. Based on the result obtained in this study, it could be suggested that for good growth and yield of okra at optimum rate of bio-soil amendment in the pot trial which is 12,028.38 kg ha⁻¹ at 800ppm for the 551 F1 Hybrid Okra named Green Torpedo variety should be recommended. This combined results showed that the bio-soil amendment have significant potential to be applied in organic urban farming and sustainable agriculture in Malaysia especially for okra production system. Extended studies should be conducted to validate the effect of bio-soil amendment on the okra plant which includes soil physical and biological properties.

ABSTRAK

KESAN PENGGUNAAN PINDAAN BIO-TANAH TERHADAP PERTUMBUHAN DAN HASIL BENDI (*Abelmoschus esculentus* L. Moench)

Kajian ini dijalankan dari Disember 2015 hingga November 2016 di Fakulti Pertanian Lestari, Universiti Malaysia Sabah di Sandakan. Eksperimen lapangan (Eksperimen 1 dan Eksperimen 3) telah dijalankan di kawasan plot penyelidikan di bawah rumah perlindungan hujan dan Eksperimen 2 telah dijalankan di makmal untuk menilai kesan pindaan bio-tanah terhadap pertumbuhan dan hasil okra (*Abelmoschus esculentus* L. Moench). Reka bentuk yang digunakan ialah Reka Bentuk Lekat Rawak Lengkap (RCBD) untuk semua eksperimen, direplikasi dan diulang lima kali dalam semua kombinasi faktorial. Keputusan menunjukkan tiada perbezaan signifikan dalam jumlah daun untuk Eksperimen 1, peratusan percambahan untuk Eksperimen 2 dan hari hingga 50% pembungaan dalam Eksperimen 3. Parameter lain adalah ketara pada paras signifikan. Penggunaan pindaan bio-tanah dari 0 hingga 200ppm dalam Eksperimen 1 pada 80 DAS untuk parameter pertumbuhan, meningkat dengan ketara pada ketinggian pokok (68.50 cm), diameter batang pokok (1.45 cm) dan keluasan daun (747.12 cm²). Interaksi yang ketara diperhatikan pada pindaan bio-tanah pada panjang pod (12.12 cm), berat pod (10.08 g), bilangan pod per tumbuhan (45.33) dan berat segar (197.58 g) dan berat kering (107.79 g) masing-masing. 551 F1 Hybrid Okra bernama variasi Hijau Torpedo dengan ketara memberi statistik paras pada hasil pod (4405.91 ton / ha). Dalam Eksperimen 2, dua kajian dijalankan. Yang pertama dilakukan untuk menilai kesan kadar perubahan bio-tanah yang berlainan pada percambahan. Percubaan kedua direka untuk menyiasat kesan kadar perubahan bio-tanah yang berlainan pada kemunculan anak benih. Bacaan tertinggi dicatatkan dengan T6 (88.67%) dan purata masa percambahan purata adalah paling rendah di T6 (3 hari). Dalam Eksperimen 3, enam tahap perubahan bio-tanah T1-0.0ppm sebagai kawalan (aplikasi air), T2-50ppm, T3-100ppm, T4-200ppm, T5-400ppm dan T6-800 ppm. Pada 81 DAS, terdapat perubahan ketara pada parameter pertumbuhan seperti ketinggian pokok (100.19 cm), jumlah daun (46.93), diameter batang pokok (1.88 cm), keluasan daun (702.31 cm²), berat segar (546.72 g) berat kering (178.49 g) masing-masing. Signifikan respon dilihat pada parameter hasil seperti panjang pod (11.73 cm), diameter pod (1.64 cm), berat pod (13.76 g), jumlah pod (32.53 / pokok) dan hasil 10.16 tan / ha. Satu korelasi yang sangat penting dan positif diperoleh antara hasil buah okra dan ketinggian tumbuhan, bilangan daun setiap tumbuhan, diameter batang dan jumlah buah setiap tumbuhan. Analisis regresi dijalankan menunjukkan bahawa kadar pindaan bio-tanah menghasilkan tindak balas kuadratik dalam Eksperimen 3. Berdasarkan hasil yang diperolehi dalam kajian ini, dapat dicadangkan agar pertumbuhan yang baik dan hasil okra pada level optimum dengan penggunaan perubahan bio-tanah untuk tanaman pasu adalah 12,028.38 kg ha⁻¹ pada 800ppm untuk 551 F1 Hybrid Bendi, Green Torpedo. Disyorkan bahawa pindaan bio-tanah ini mempunyai potensi besar untuk digunakan dalam pertanian organik dan pertanian lestari di Malaysia terutama untuk sistem pengeluaran okra. Kajian jangka panjang rawatan yang digunakan dalam kajian ini perlu dijalankan untuk memastikan kesannya terhadap sifat fiziko-kimia tanah.