



UNIVERSITI PUTRA MALAYSIA

**EFFECT OF CONTROL RELEASE FERTILIZER (CRF) ON GROWTH
MEDIA FOR OIL PALM SEEDLINGS (*Elaeis guineensis*) GROWTH**

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MOHAMAD FIKRI BIN HARMAN

**A project paper submitted in partial fulfillment of the requirement for
Bachelor in Agriculture Science in the Faculty of Agriculture**

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CERTIFICATION

This project paper entitled 'Effect of Control Release Fertilizer (CRF) On Growth Media for Oil Palm Seedlings (*Elaeis guineensis*) Growth' is submitted by Mohamad Fikri Bin Harman in partial fulfillment for the requirement of a Bachelor Degree in Agricultural Science.

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CONTENTS

	Page
CERTIFICATION	i
ACKNOWLEDGEMENT	ii
CONTENTS	iii
LIST OF TABLE	vi
LIST OF FIGURE	vii
LIST OF APPENDIX	ix
ABSTRACT	xi
ABTRAK	xii
CHAPTER	
1.0 INTRODUCTION	1
2.0 LITERATURE REVIEW	4
2.1 Origin and History of Oil Palm	4
2.2 Oil Palm Industry in Malaysia	6
2.3 Botanical Description	7
2.3.1 Root	7
2.3.2 Stem	7
2.3.3 Frond	8
2.4 Planting Material	8
2.5 Development of Oil Palm Seedlings	9

2.6	Manuring	10
2.6.1	Nitrogen	12
2.6.2	Phosphorus	13
2.6.3	Potassium	14
2.6.4	Control Release Fertilizer	14
2.6.4.1	Natural Organic Fertilizer	15
2.6.4.2	Organic Synthetic Fertilizer	16
2.6.4.3	Polymer Coated Fertilizer	16
3.0	MATERIALS AND METHODS	18
3.1	Research Location	18
3.2	Research Materials	18
3.3	Treatments	19
3.4	Research Design	19
3.5	Nursery Practice	19
3.5.1	Medium of Growth	19
3.5.2	Planting	20
3.5.3	Watering	20
3.5.4	Weeding and Pest Control	20
3.6	Data Collection	20
3.6.1	Plant Height and Frond Length	21
3.6.2	Top and Lower Fresh and Dry Weight	21
3.6.3	N, P, K Analysis	21
3.7	Data Analysis	21

4.0	RESULT AND DISCUSSION	22
4.1	Plant Height	22
4.2	Fronde Length	32
4.3	Top Dry Weight	41
4.4	Root Dry Weight	44
4.5	Nitrogen Content	47
4.6	Phosphorus Content	50
4.7	Potassium Content	53
5.0	CONCLUSION	56
6.0	BIBLIOGRAPHY	58
7.0	APPENDICES	60

LIST OF TABLE

Table	Page
1. Annual yield of oil	5
2. Usage of fertilizer by crop in Malaysia	12
3. Rate of fertilizer according to treatments	19



LIST OF FIGURE

Figure	Page
1. Plant height (cm) according to varieties for fourth week	24
2. Plant height (cm) according to treatments for fourth week	25
3. Plant height (cm) according to varieties for eighth week	27
4. Plant height (cm) according to treatments for eighth week	28
5. Plant height (cm) according to varieties for twelve week	30
6. Plant height (cm) according to treatments for twelve week	31
7. Frond length (cm) according to varieties for fourth week	33
8. Frond length (cm) according to treatments for fourth week	34
9. Frond length (cm) according to varieties for eighth week	36
10. Frond length (cm) according to treatments for eighth week	37
11. Frond length (cm) according to varieties for twelve week	39
12. Frond length (cm) according to treatments for twelve week	40
13. Top dry weight (g) according to varieties for twelve week	42
14. Top dry weight (g) according to treatments for twelve week	43
15. Root dry weight (g) according to varieties for twelve week	45
16. Root dry weight (g) according to treatments for twelve week	46
17. Nitrogen content (%) according to varieties for twelve week	48
18. Nitrogen content (%) according to treatments for twelve week	49
19. Phosphorus content (%) according to varieties for twelve week	51
20. Phosphorus content (%) according to treatments for twelve week	52

21. Potassium content (%) according to varieties for twelve week	54
22. Potassium content (%) according to treatments for twelve week	55



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LIST OF APPENDIX

Appendix	Page
1. ANOVA TABLE - The height of oil palm seedlings at fourth week of treatments	60
2. ANOVA TABLE - The height of oil palm seedlings at eighth week of treatments	61
3. ANOVA TABLE - The height of oil palm seedlings at twelve week of treatments	62
4. ANOVA TABLE - The frond length of oil palm seedlings at fourth week of treatments	63
5. ANOVA TABLE - The frond length of oil palm seedlings at eighth week of treatments	64
6. ANOVA TABLE - The frond length of oil palm seedlings at twelve week of treatments	65
7. ANOVA TABLE - The top dry weight of oil palm seedlings at twelve week of treatments	66
8. ANOVA TABLE - The root dry weight of oil palm seedlings at twelve week of treatments	67
9. ANOVA TABLE - The nitrogen content of oil palm seedlings at twelve week of treatments	68
10. ANOVA TABLE - The phosphorus content of oil palm seedlings at twelve week of treatments	69

11. ANOVA TABLE - The potassium content of oil palm seedlings at twelve
week of treatments

70



ABSTRACT

Fertilizer is an important input that supplies nutrients to plants for their optimum growth and production. In oil palm plantation, large amount of fertilizers is required and commonly fertilizers are easily leached off and promote wastage especially if they are applied at higher rates. Control Release Fertilizer (CRF) are claimed to be able to replace or become alternative to the conventional fertilizers and to increase efficiency of nutrient uptake, an appropriate fertilization should be done at the main nursery stage. The objective of this study is to determine the optimum rate of control release fertilizer for oil palm seedlings growth comparing them with the standard conventional fertilizers at the main stage of nursery. This experimental design that was used is Complete Randomized Design (CRD) with four treatments: T1 is a control treatment using NPK Blue (12:12:17:2) whereas T2, T3 and T4 each, using SK COTE® Precise (19-10-13+2.5MgO+TE) at 25g/bag, 50g/bag and 75g/bag respectively. There were two different sources of oil palm seedlings used which were from Sime Darby and FELDA with four replications. The parameters that were collected in this experiment are oil palm height, frond length, root dry weight, top dry weight and top fresh weight for quantitative measurement. While for qualitative measurement, N, P, K contents will be analyzed using Auto Analyzer (AA) and Atomic Absorption Spectrophotometer (AAS). Analysis of data will be used is the Statistical Analysis System (SAS) and Least Significant Difference (LSD) for mean comparison.

ABSTRAK

Baja merupakan input penting yang membekalkan nutrien untuk tumbuh-tumbuhan untuk pertumbuhan dan pengeluaran yang optimum. Dalam industri perladangan sawit, jumlah besar baja diperlukan dan biasanya baja mudah larut lesap serta menggalakkan pembaziran terutamanya jika ia digunakan pada kadar yang lebih tinggi. Baja lepas terkawal (CRF) dikatakan mampu untuk menggantikan atau menjadi alternatif kepada baja konvensional. Untuk meningkatkan kecekapan pengambilan nutrien, pembajaan yang sesuai perlu dilakukan di peringkat tapak semaian utama. Objektif kajian ini adalah untuk menentukan kadar optimum baja lepas terkawal untuk pertumbuhan anak benih kelapa sawit dengan membandingkan mereka dengan baja konvensional di tapak semaian utama. Kajian ini menggunakan rekabentuk Rawak Lengkap (CRD) dengan empat rawatan: T1 adalah rawatan kawalan menggunakan NPK Biru (12: 12: 17: 2) manakala T2, T3 dan T4 masing-masing menggunakan SK COTE® Precise (19 -10-13 + 2.5MgO + TE) pada kadar 25g / beg, 50g / beg dan 75g / beg. Dua sumber anak sawit yang berbeza digunakan iaitu dari Sime Darby dan FELDA dengan empat replikasi. Parameter yang diambil dalam eksperimen ini adalah tinggi anak sawit, panjang pelepah, berat kering akar, berat kering bahagian atas dan berat basah bahagian atas untuk pengukuran kuantitatif. Manakala bagi pengukuran kualitatif, kandungan N, P, K akan dianalisis menggunakan Auto Analyzer (AA) dan Spektrometer Serapan Atom (AAS). Program SAS digunakan untuk menganalisis data dengan menggunakan Least Significant Different (LSD) untuk perbandingan antara nilai purata.

Chapter 1

INTRODUCTION

Oil palm industry in Malaysia had proven to be stable and steadily increase its productivity especially in value added product. There are numerous research done to increase the yield on this *golden crop*. This lead plantation company to open up more area to cultivate oil palm which is known to produce multipurpose products. From recent data, oil palm cultivation occupies around 14 percent of total land area in Malaysia. Production of crude palm oil (CPO) in 2013 recorded 18.5 million tones and contributes RM 83 billion of total gross income (Belvinder Sron, 2014). Thus, oil palm became a major crop that equally contributing to Malaysian income.

De Geus (1973) claimed that there are tremendous potential for raising the yield of oil palms which are by breeding, effective use of fertilizers and good culture practices. The efficient practice in plantation and estate such as efficient utilization of fertilizer is vital in oil palm. The proper management of nutrient requirements of oil palms will promote better performance of growth and therefore increases the production of oil palm at maximum level. Fertilizer will applied to the crops for providing adequate nutrients needed by crops. Fertilizers become one of the highest cost in input production for oil palm. Adequate of nutrient supply to the oil palms is very crucial for profitable production without wastage (MPOB, 2004).

Frequently application of fertilizer to the crops will cause wastage and promoting pollution such as pollution of drinking water, eutrophication of rivers, volatilization of NH_3 and nitrogen oxides, imbalances quality of plant products and others. Besides that, excessive use of fertilizer also promotes bad effects to the plants as well as detrimental to the plants and stimulate various fungal and disease and also easily attack by insects (Mengel et al, 2003).

Effective and efficient use of fertilizers is vital to ensure there is no excessive application of fertilizers and able to reduce cost of production. Therefore, there is another way to overcome this problem by using control release fertilizers (CRFs). In theory, this kind of fertilizer is more beneficial than inorganic fertilizer or conventional fertilizer which is high labour intensive and need to apply frequently and intensive supervision by the manager in plantations and estates.

Early studies on oil palm, rubber and cocoa show potential of CRFs as a substitute for inorganic fertilizers especially in nursery (Ong et al, 1992). Therefore, further studies should be done in order to look into the possibility of using CRFs and evaluate the effectiveness as an alternative fertilizer in oil palm cultivation.

RESEARCH OBJECTIVES

- 1) To determine the optimum rate of control release fertilizer (CRF) for oil palm seedlings growth in the main nursery.
- 2) To compare the performance of different sources of fertilizer (CRF) for oil palm seedlings growth in the main nursery.



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