

**THE EFFECTIVENESS OF ADDITIONAL EFFECTIVE
MICROORGANISM (EM) ON GROWTH OF AEROBIC RICE CV. MRIA 1**

HAIDA IDAYU BINTI HAMIDIN

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Technology and Plantation Management
in the Faculty of Plantation and Agrotechnology
Universiti Teknologi MARA**

JULY 2019

ACKNOWLEDGEMENTS

Bismillahirrahmanirrahim, Praise to Allah for his bless, I am able to complete my Final Year Project smoothly. I am grateful and would like to express my sincere gratitude to my supervisor Dr Siti Maslizah Abdul Rahman and my co-supervisor Dr. Munira Bt. Shahbuddin for her invaluable guidance, continuous encouragement and constant support in making this assignment.

I am really appreciates for her guidance from the initial to the final level that enabled me to develop an understanding regarding to this review thoroughly. Without her advice and assistance, I am sure that it would be a lot tougher to achieve this completion. I am also sincerely thanking her for the time spends in proofreading and correction my mistakes.

Next, I would like to extend my thanks to the most precious persons in my life which are my family. I acknowledge my sincere indebtedness and gratitude to my family for their love, support and sacrifices throughout my life.

Lastly, million thanks to many people, especially to other lecturer and my classmates have made valuable comment suggestions on my paper which gave me an inspiration to improve the quality of my Final Year Project.

Your sincerely,

HAIDA IDAYU BINTI HAMIDIN

TABLE OF CONTENTS

	<u>Page</u>
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLE	vi
LIST OF FIGURES	vii
LIST OF PLATE	viii
LIST OF ABBREVIATIONS	x
ABSTRACT	xii
ABSTRAK	xiii
<u>CHAPTER</u>	
1 INTRODUCTION	
1.1 Research background	1
1.2 Problem statement	4
1.3 Objectives	5
1.4 Significance of study	5
1.5 Scope of study	6
1.6 Hypothesis	6
1.7 Limitation of study	6
2 LITERATURE REVIEW	
2.1 Rice	8
2.2 Aerobic rice	11
2.3 Microorganisms	13
2.4 Effective microorganism	16
2.5 Benefit of effective microorganism for plant	17
3 MATERIALS AND METHODS/RESEARCH METHODOLOGY	18
3.1 Seed preparation	19
3.2 Greenhouse preparation	19
3.3 Soil analysis	20
3.4 Pot preparation	21
3.5 Transplanting	21
3.6 Preparation of EM	22
3.6.1 Formulation of stock solution EM-2	23
3.6.2 Formulation of stock solution EM-4	23
3.7 Treatment	25
3.8 Fertilizer and EM application	26

3.9	Experimental design	27
3.10	Water application	28
3.11	Weed control	28
3.12	Experimental design	29
3.12.1	Dry mass	29
3.12.2	SPAD value	30
3.12.3	Number of tillers and panicle	31
3.12.4	Filled seed weight	31
3.13	Statistical analysis	32
4	RESULTS	33
4.1	SPAD value	34
4.2	The mean number of panicle	35
4.3	The mean number of tiller	36
4.4	Shoot dry mass	37
4.5	Root dry mass	38
4.6	Filled seed per pot	39
5	DISCUSSION	40
6	CONCLUSIONS AND RECOMMENDATIONS	45
	CITED REFERENCES	47
	APPENDICES	
	Appendix 1 Mean analysis for shoot dry weight	51
	Appendix 2 Variance for shoot dry weight	51
	Appendix 3 Mean analysis for root dry weight	53
	Appendix 4 Variance for root dry weight	54
	Appendix 5 Mean analysis for number of tiller	55
	Appendix 6 Variance for number of tiller	56
	Appendix 7 Mean analysis for data SPAD value	57
	Appendix 8 Variance for data SPAD value	58
	Appendix 9 Mean analysis for number panicle	59
	Appendix 10 Variance for number panicle	60
	Appendix 11 Mean analysis for filled seed	61
	Appendix 12 Variance for filled seed	61
	Appendix 13 Raw of data	62
	Appendix 14 Work process in experiment	64
	CURRICULUM VITAE	81

ABSTRACT

THE EFFECTIVENESS OF ADDITIONAL EFFECTIVE MICROORGANISM (EM) ON GROWTH OF AEROBIC RICE CV. MRIA 1

This study was conducted to evaluate the effectiveness of additional EM on growth of aerobic rice cv. MRIA 1. The objective of this study was to investigate the effect of additional EM on growth and yield component of aerobic rice cv. MRIA 1. This experiment was carried out by using CRD experimental design consisted of three treatments with two replications. MRIA 1 was obtained from MARDI for used as planting materials and has been applied by three different concentration of EM at different growth stage. The first treatment (T1) as a control, applied with recommended chemical fertilizer (normal practices) with 1.8g NPK + 0.9g Urea with no additional of EM, 2nd treatment (T2) with 0.9g NPK + 0.9g Urea + 100ml EM-4 at and 3rd treatment (T3) with 0.9g NPK + 0.9g Urea + 200ml EM-4. There were five series of harvesting (40, 60, 74, 88, 102 DAS) whereas data of panicles, tillers, SPAD value, dry biomass (shoot and root) and fresh seed weight (at last harvest) were recorded. Result shown that there was a significant difference between treatments for all parameters studies. The growth pattern was more rapid in additional of 100ml of EM (T2), also the highest number of tiller (28 per pot), number of panicles (23.5 per pot), with root and shoot dry mass respectively obtained (4.164g) and (4.527g), filled seed was (19.84g per pot) only at 5th harvest. However, the lowest data recorded of all parameter is application of additional 200ml of EM (T3). As a conclusion, application of additional EM of 0.9g NPK + 0.9g Urea + 100ml EM improved plant growth and yield component of aerobic rice cv. MRIA 1.

Keywords: effective microorganism (EM), additional EM, aerobic paddy, fertilizer uptake, day after sowing (DAS).