

UNIVERSITI TEKNOLOGI MARA

**EFFECTS OF *Bacillus safensis* INOCULATION
AND P FERTILIZER
ON THE GROWTH OF PALM SEEDLINGS**

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Final Year Project Report Submitted in Partial Fulfilment of the
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DECLARATION

This final year project is a partial fulfilment of the requirements for a degree of Bachelor of Science (Hons.) Plantation Technology and Management, Faculty of Plantation and Agrotechnology, Universiti Teknologi Mara.

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TABLE OF CONTENT

TITLE	PAGE
Acknowledgement	iii
Table of content	iv
List of figures	vii
List of tables	ix
List of abbreviations	x
Abstract	vi
Abstrak	xii
Chapter One : INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	3
1.3 Significance of study	4
1.4 Objective of study	4
Chapter Two : LITERATURE REVIEW	
2.1 Description of oil palm	
2.1.1 Taxonomic classification of oil palm	5
2.1.2 The oil palm seedlings	9
2.2 Malaysian oil palm seedling production	11
2.3 Plant Growth Promoting Rhizobacteria	
2.3.1 Phosphate Solubilizing Bacteria	13
2.4 Phosphatic fertilizer	15
Chapter Three : METHODOLOGY	
3.1 Material	
3.1.1 Raw materials	17
3.1.2 Chemicals	17
3.1.3 Apparatus	17
3.2 Method	
3.2.1 Sterilization of oil palm seed	18
3.2.2 Effect of PSB inoculation on the growth of palm seedlings	18
3.3 Parameter	
3.3.1 Number of leaves	19

ABSTRACT

Bacillus safensis is one of phosphate solubilizing bacteria (PSB) that act as plant regulator in plant. Bacteria that abundant in the soil forces recycling the soil nutrient that crucial for soil fertility, induced better rooting development and improving crop production. There are many beneficial effects of PSB on plants that have been described but the use of PSB as bio-fertilizer in oil palm seedlings is less documented. The ability of *Bacillus safensis* to improve growth of oil palm seedlings and the effects on P availability in presence of Christmas island rock phosphate (CIRP) were carried out in the pot experiment at the Greenhouse, UiTM Jasin. The experiment was arranged in Completely Randomized Design(CRD) with four treatment and three replication. Treatments include seeds that inoculated with *Bacillus safensis* and presence of CIRP (P-PSB), seeds that not inoculated with *Bacillus safensis* and presence of CIRP (P-WPSB), seeds that inoculated with *Bacillus safensis* and absence of CIRP (PSB) and control treatment, seeds that not inoculated with *Bacillus safensis* and absence of CIRP (WPSB). Sterilized seed of oil palm seedlings were planted in polybag containing 1kg soil and the growth performance of the treatment observed for four weeks of germination. The treated seed with *Bacillus safensis* significantly increased the height of seedlings (38.18 cm) and improved the roots development compare to non-inoculated treatments. The presence of CIRP in the soil solution increased the P uptake in plants and result in positive effect on seedling growth in respect to average of root length, shoot length, height of seedlings, number of roots and number of leaves. The results showed that inoculation of oil palm seedlings with *Bacillus safensis* improve phosphate solubilizing activity of incorporated CIRP. The inoculation could improved the growth development of host plant and hence be used as microbial fertilizer in minimized the dependence on chemical fertilizer and providing a sustainable agriculture.

Keywords : Phosphate solubilizing bacteria, *Bacillus safensis*, oil palm seedlings, Phosphorus fertilizer, CIRP