

**ISOLATION AND CHARACTERIZATION OF FUNGAL  
PATHOGEN ISOLATED FROM INFECTED SEEDS OF OIL  
PALM**

**NUR NADHIRAH HANNAN BINTI ZAMZURI**

**Final Year Project Report Submitted in  
Partial Fulfillment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Biology  
in the Faculty of Applied Science  
Universiti Teknologi MARA**

**JULY 2018**

This Final Year Project Report entitled **“Isolation and Characterization of Fungal Pathogen Isolated from Infected Seeds of Oil Palm”** was submitted by Nur Nadhirah Hannan binti Zamzuri, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences, and was approved by

---

Dr. Aslizah binti Mohd Aris  
Supervisor  
Faculty of Applied Sciences  
Universiti Teknologi MARA (UiTM)  
Negeri Sembilan, Kampus Kuala Pilah  
Pekan Parit Tinggi, 72000 Kuala Pilah  
Negeri Sembilan

---

Lili Syahani binti Rusli  
Coordinator FSG661 AS201  
Faculty of Applied Sciences  
Universiti Teknologi MARA (UiTM)  
Negeri Sembilan, Kampus Kuala Pilah  
Pekan Parit Tinggi, 72000 Kuala Pilah  
Negeri Sembilan

---

Dr. Aslizah binti Mohd Aris  
Head of Biology School  
Faculty of Applied Sciences  
Universiti Teknologi MARA (UiTM)  
Negeri Sembilan, Kampus Kuala Pilah  
Pekan Parit Tinggi, 72000 Kuala Pilah  
Negeri Sembilan

Date: \_\_\_\_\_

## TABLE OF CONTENTS

	<b>PAGE</b>
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATIONS</b>	ix
<b>ABSTRACT</b>	x
<b>ABSTRAK</b>	xi
<b>CHAPTER 1: INTRODUCTION</b>	
1.1 Background Study	1
1.2 Problem Statement	2
1.3 Significance of the Study	4
1.4 Objectives of the Study	5
<b>CHAPTER 2: LITERATURE REVIEW</b>	
2.1 <i>Elais guineensis</i>	6
2.2 Structure of oil palm trees	7
2.3 Plantations of oil palm trees	9
2.3.1 Seedling stage	9
2.3.2 Nursery stage	10
2.3.3 Field stage	11
2.4 Applications of oil palm	12
2.5 Economic contributions of oil palm	14
2.6 Factors affecting production of oil palm trees	16
2.6.1 Abiotic factors	17
2.6.2 Biotic factors	18
2.7 Plant diseases	19
2.8 Fungal diseases of oil palm seeds	19
2.8.1 Seed rot and brown germ	20
2.9 Fungal disease detection in oil palm seeds by using Koch's postulates	23

<b>CHAPTER 3: METHODOLOGY</b>		
3.1	Materials	24
	3.1.1 Raw Materials	24
	3.1.2 Chemicals	24
	3.1.3 Apparatus	24
3.2	Methods	25
3.3	Sample characterization and preparation	26
	3.3.1 Collection of seed samples	26
	3.3.2 Diagnosis of symptoms and signs in oil palm seeds	26
3.4	Isolation and identification of fungal pathogen by using PDA agar	27
3.5	Morphological characterization of isolated fungal pathogen	27
	3.5.1 Macroscopic observations of isolated fungal pathogen	28
	3.5.2 Microscopic observations of isolated fungal pathogen	28
3.6	Inoculation of isolated fungal pathogen into healthy seeds	29
3.7	Re-isolation of fungal pathogen from infected healthy seeds	29
3.8	Characterization of infected healthy seeds	29
	3.8.1 Observation of symptoms and clinical signs of infected healthy seeds	29
	3.8.2 Characterization of isolated fungal pathogen from culture media	30
<b>CHAPTER 4: RESULTS AND DISCUSSION</b>		
4.1	Diagnosis of symptoms and signs in oil palm seeds	31
4.2	Isolation and identification of fungal pathogen by using PDA agar	34
4.3	Inoculation of isolated fungal pathogen into healthy seeds	38
4.4	Re-isolation of fungal pathogen from re-infected seed by using PDA agar	42
<b>CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS</b>		45
<b>CITED REFERENCES</b>		46
<b>APPENDICES</b>		51
<b>CURRICULUM VITAE</b>		52

## ABSTRACT

### ISOLATION AND CHARACTERIZATION OF FUNGAL PATHOGEN ISOLATED FROM INFECTED SEEDS OF OIL PALM

Oil palm is known as one of major contributions to national's economy. Diseases that caused by fungal pathogen are the major cause of yield and quality declining to oil palm plantations. Brown germ and seed rot were the most diseases detected during seed stage in oil palm plantations. The present study was conducted to isolate and morphologically characterize the fungal pathogen from infected seeds of oil palm and to prove that the fungal pathogen consistently a causative agent of seed disease. The infected seed was observed through its symptoms such as brown color of both plumule and radicle with stubby radicle. The isolated fungal from infected seed was designated as seed oil palm 1 (SOP1). The microscopic observations of SOP1 were hyaline and smooth-walled conidiophores, globose shape of conidia, biseriate phialides, radiate conidial heads and septate and hyaline of hyphae. The identification of SOP1 was proposed belonged to the genera of *Aspergillus* species. Healthy seed that has been infected with SOP1 showed similar symptoms as infected seed. The microscopic observations of re-isolated SOP1 from the re-infected healthy seed displayed similar morphology as SOP1. Hence, morphological, macroscopic and microscopic method was important for identification of *Aspergillus* species that caused several diseases to oil palm seeds. From the macroscopic and microscopic observations, it can be concluded that *Aspergillus* species proved to be a causal agent of several diseases in oil palm seeds.