

REVIEW ON POTENTIAL NATIVE PLANTS TO DEGRADE
HYDROCARBON IN SOIL AND WATER

MUHAMMAD HAKIM BIN ABDULLAH

FACULTY OF CHEMICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA JOHOR
PASIR GUDANG CAMPUS

APRIL 2015

ACKNOWLEDGEMENT

First and foremost, my gratitude for the god Allah S.W.T for giving me health and blessing to complete this study. I have to thank my research supervisor Miss Salmi Nur Ain Binti Sanusi. Without her assistance and dedicated involvement in every step throughout the process, this final year project would never been accomplished. I would like to thank you very much for your support and understanding over these past four month. My Thanks also given to all chemical faculty lecturer in Uitm Pasir Gudang for their guidance and knowledge.

Getting through my final year project required more than academic support, and I have many, many people to thanks for listening to and at time having to tolerate me over past few month. I cannot begin to express my gratitude and appreciation for their friendship. Farid, Aiman, Syazwina, Danial and Salihan have been unwavering in their support during the time of completed the project.

Most importantly, none of this could have happened without my family. Gratitude to my parent, and to all my brothers and sister for their encouragement and support. This final year project stands as a testament to your unconditional love and encouragement.

ABSTRACT

Phytoremediation using plant such as *Scirpus grossus*, *Jatropha curcas*, *Bassia scoparia* and *Seepweed* has been suggested as an environmentally friendly and economical method for treating contaminated soil and water. It is the latest alternative to recovery technique. In this study, soil and water with contaminated hydrocarbon was remediated with plants being study. Hydrocarbon is a naturally occurring liquid with widely different composition and complexity. Because of that, hydrocarbon was chosen as a contaminant in soil and water. The degradation of hydrocarbon from the soil by *S. grossus*, *Jatropha curcas*, *Bassia scoparia* and *Seepweed* is 77.9%, 96.6%, 28.7% and 20.1%. The degradation of hydrocarbon from the water by *S. grossus* is 81.5% and 80.2%. From that, result show which native plants degrade more or less contaminant hydrocarbon in soil and water. For both removal contaminant hydrocarbon in soil and water by *S. grossus* the increased because of help by the rhizobacteria. Moreover, *S. grossus* only take 72 days to degrade more hydrocarbon contaminated in soil and water. It is better than other plants because it take less period and depend on potential plant to degrade hydrocarbon. Hence, *S. grossus* could be a promising solution for the phytoremediation of industrial contaminated water and soil with hydrocarbon.

TABLE OF CONTENTS

		PAGE
DECLARATION		vii
CERTIFICATION		vii
ABSTRACT		vii
TABLE OF CONTENTS		vii
LIST OF TABLES		viii
LIST OF FIGURES		viii
LIST OF ABBREVIATIONS		viii
LIST OF SYMBOLS		vii
CHAPTER 1	INTRODUCTION	1
	1.1 Research Background	1
	1.2 Problem Statement	2
	1.3 Objectives of Researches	3
	1.4 Scopes of Researches	3
CHAPTER 2	LITERATURE REVIEW	4
	2.1 Pollution	4
	2.1.1 Soil Pollution	5
	2.1.2 Water Pollution	7
	2.2 Contaminants in Soil and Water	8
	2.2.1 Heavy metals contaminant	9

	2.2.2 Hydrocarbon contaminant	11
2.3	Remediation Technique of Hydrocarbon	12
	2.3.1 Phytoremediation technique	15
2.4	Phytoremediation	18
	2.4.1 Advantages of phytoremediation	19
	2.4.2 Disadvantages of phytoremediation	20
	2.4.3 Plants Use in Phytoremediation	22
2.5	Native Plants in Malaysia	23
CHAPTER 3	METHODOLOGY	25
3.1	Introduction	25
	3.1.1 Pilot construction wetland design	25
	3.1.2 Plant sampling	26
	3.1.3 Analysis of diesel in medium, plant, and rhizobacteria culture	27
	a) Extraction of diesel from medium (water and soil)	27
	b) Plant extraction	28
	3.1.4 Scanning electron microscopy (SEM) and energy-dispersive X-ray (EDX) analysis	28
	3.1.5 Microbial assessment in the root zone	29