

**UNIVERSITI TEKNOLOGI MARA**

**TREATMENT OF PALM OIL MILLS  
EFFLUENT USING FENTON  
TREATMENT**

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Project submitted in fulfilment of the requirements for  
the degree of  
**Bachelor in Environmental Safety and Health  
(Hons.)**

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## DECLARATION BY STUDENT

Project entitled “**Treatment of Palm Oil Mills Effluent using Fenton Treatment**” is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor, Dr. Ahmad Razali bin Ishak. It has been submitted to the Faculty of Health Sciences in partial fulfilment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

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*In the name of Allah, The Most Gracious, The Most Merciful.*

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## ABSTRACT

High incidence of surface water pollution contributed by palm oil mill effluent (POME) is implacable and proper treatment of the effluent is necessary. Thus, the feasibility of Fenton treatment for turbidity reduction of POME was investigated to obtain the optimum operating conditions such as reaction time,  $\text{H}_2\text{O}_2$  dosage,  $\text{H}_2\text{O}_2$ :  $\text{Fe}^{2+}$  ratio and pH condition followed by the phytotoxicity study of the treated POME. A fast reaction of Fenton was achieved within 10 minutes of treatment, which successfully removed ~87% of the turbidity. The Fenton reaction was favourable in both acidic whereby 87% of turbidity were successfully removed at pH 3. Higher percentage of turbidity removal (86%) was obtained and optimised at 25 mM of  $\text{H}_2\text{O}_2$  with 1:1 ratio of  $\text{H}_2\text{O}_2$ :  $\text{Fe}^{2+}$ . On the other hand, the phytotoxicity of treated POME that was evaluated based on the germination index of mung beans and lady finger showed a decline of the relative toxicity from 70% and 80% of mung beans and lady finger to 40% and 70%, respectively. The final chemical oxygen demand (COD) concentration of treated POME at 127 mg/L was compliance with Malaysian discharge standard. These findings indicate that Fenton reaction with some optimisations is effective to be utilized for POME treatment without any signs of phytotoxicity.

*Keywords; POME, turbidity, POME treatment, Fenton oxidation, phytotoxicity*

## **TABLE OF CONTENTS**

<b>TITLE PAGE</b>	
<b>DECLARATION BY STUDENT</b>	<b>i</b>
<b>INTELLECTUAL PROPERTIES</b>	<b>ii</b>
<b>APPROVAL BY SUPERVISOR</b>	<b>v</b>
<b>ACKNOWLEDGEMENT</b>	<b>vi</b>
<b>ABSTRACT</b>	<b>vii</b>
<b>TABLE OF CONTENTS</b>	<b>viii</b>
<b>LIST OF TABLES</b>	<b>xi</b>
<b>LIST OF FIGURES</b>	<b>xii</b>
<b>LIST OF EQUATIONS</b>	<b>xiii</b>
<b>LIST OF ABBREVIATIONS</b>	<b>xiv</b>
<b>CHAPTER 1: INTRODUCTION</b>	<b>1</b>
1.1 Background study	1
1.2 Problem Statement	3
1.3 Significance of Study	4
1.4 Objectives of Study	5
1.5 Conceptual Framework	6
<b>CHAPTER 2: LITERATURE REVIEW</b>	<b>7</b>
2.1 Water Pollution	7
2.2 Industrial Effluents	8
2.3 Palm Oil Mill Effluent	10
2.3.1 Characteristics of POME	10
2.4 Palm Oil Mill Treatment	12
2.4.1 Conventional Treatments	12
2.4.2 Alternative Treatments	13
2.4.3 Performance of Past Treatments	15