

**UNIVERSITI TEKNOLOGI MARA**

**DETERMINATION OF TRACE METALS IN PALM  
OIL PLANTATION SOIL AND ITS POTENTIAL  
RISK TOWARDS HUMAN HEALTH**

**NUR FATIHAH BINTI ABDUL RAHMAN**

**BACHELOR (HONS.) OF  
ENVIRONMENTAL HEALTH AND  
SAFETY**

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## **Declaration by Student**

This project entitled Determination of Trace Metals in Palm Oil Plantation Soil and Its Potential Risk towards Human Health is a presentation of my original research work. Wherever contribution of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Mr Razi Ikhwan Md Rashid as my project supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor (Hons.) in Environmental Health and Safety

Student's Signature:

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(Nur Fatimah Binti Abdul Rahman)

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## LIST OF TABLES

TITLE PAGE	
ACKNOWLEDGEMENT	i
TABLE OF CONTENT	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF EQUATIONS	viii
LIST OF APPENDICES	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xii

### CHAPTER ONE: INTRODUCTION

1.1	Background Information	1
1.2	Problem Statement	2
1.3	Study Justification	3
1.4	Study Objectives	7
1.5	Conceptual And Operational Definition	7
1.6	Conceptual Framework	11

### CHAPTER TWO: LITERATURE REVIEW

2.1	Agriculture	12
2.2	Properties of Trace Metal	12
2.3	Importance of Trace Metal	13
2.4	Trace Metal Occurrence in Soil	13
2.5	Toxicity of Trace Metal	14
2.6	Carcinogenicity of Trace Metals	15

### CHAPTER THREE: METHODOLOGY

3.1	Study Location	17
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3.2	Study Design	19
3.3	Sampling Technique	19
	3.3.1 Soil Sampling with Auger	19
	3.3.2 Sample Size	20
3.4	Sample Preparation and Analysis Method	20
	3.4.1 Sample Preparation and Extraction Procedure	20
	3.4.2 Instrumentation	21
	3.4.3 Reagents	22
3.5	Quality Control	23
	3.5.1 Equipment Calibration	23
	3.5.2 Standard Operating Procedure	23
3.6	Graphite Furnace Atomic-Absorption Spectroscopy (GFAAS)	24
	Analysis	
	3.6.1 Calculation of trace metal level in soil sample	24
3.7	Data Analysis	24
3.8	Health Risk Assessment	25
3.9	Study Limitation	28

## **CHAPTER FOUR: RESULTS**

4.1	Introduction	29
4.2	Concentration of Trace Metal in Palm Oil Soil Plantation	29
4.3	Comparison of Trace Metals Concentration in Soil Sample at Different Sampling Site Location	38
4.4	Human Health Risk Assessment	45
	4.4.1 Estimation of Potential Health Risk	45
	4.4.2 Chronic Daily Intake (CDI)	46
	4.4.3 Calculation for Hazard Quotient (HQ) and Hazard Index (HI)	52

## Abstract

### Determination of Trace Metals in Palm Oil Plantation Soil and Its Potential Risk towards Human Health

Nur Fatihah Binti Abdul Rahman

**Introduction:** Trace metals are naturally available in soil which important for plant growth and development. However its content may increase due to application of agriculture chemicals. Its concentration in soil is influence by certain condition such soil's type, pH, and organic matter content. Increase of the concentration of trace metal is become a concern especially when it may give potential health risk. In this study, concentration of four trace metals was determined in palm oil soil plantation at Pasir Salak, Perak. **Objective:** To identify the concentration of trace metals in palm oil soil and its potential risk towards human health. **Methodology:** A total of 100 soil samples were randomly collected from two sites namely site A and site C and were sent to the laboratory for further analysis. Graphite Furnace Atomic Absorption Spectrometry (GFAAS) was used for the analysis of trace metal (Cadmium, Chromium, Iron and Potassium) concentration. **Results:** The concentration of Cadmium, Chromium and Potassium at both sites was found higher than typical range of natural occurrence of metals concentration of CLMC Guideline except for Iron which indicates those trace metal input come from other sources other than natural occurrence. The mean's value for cadmium is 0.58 mg/kg, chromium, 17.90 mg/kg, potassium 69.17 mg/kg and iron 709.78 mg/kg. While comparing the concentration with Environmental Protection Act 2009, about 6 sampling point for site C have concentration value above the limit for cadmium and only one sampling point for site A. As for chromium, all the results are complying. By referring Canadian Soil Quality Guidelines 2007, the reading concentration for cadmium and chromium showing above the limit only for one sampling point at site A and one sampling point at site B. Meanwhile, for health risk assessment, the sum of Hazard Quotient (HQ) for three exposure routes (ingestion, inhalation and skin contact) which is Hazard Index (HI) for offsite residents, outdoor workers and construction workers is below than 1 ( $HI < 1$ ). This shows that there is low or no potential health risk. **Conclusion:** Based on the study, the concentrations of trace metals are safe to human health and further research need to be done to further understand the effects of trace metals to human health via soil as exposure pathway.

Keyword: palm oil soil, trace metal, health risk assessment