

**UNIVERSITI TEKNOLOGI MARA**

**ASSESSMENT OF HEAVY METALS  
CONTAMINATION IN IRRIGATION  
WATER, SOIL AND VEGETABLES IN  
MERU VEGETABLES FARM.**

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**Project submitted in fulfilment of the requirements  
for the degree of**

**Bachelor (Hons.) Of Environmental Health And  
Safety  
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## Declaration by Student

Project entitled “Assessment of Heavy Metals Contamination in Irrigation Water, Soil and Vegetables in Meru Vegetables Farm” is a presentation of my original research work. Wherever contributions 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. Megat Azman Bin Megat Mokhtar as Project Supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

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# TABLE OF CONTENTS

<b>TITLE PAGE</b>	
<b>AUTHOR'S DECLARATION</b> .....	ii
<b>ACKNOWLEDGEMENT</b> .....	iii
<b>TABLE OF CONTENT</b> .....	iv
<b>LIST OF TABLES</b> .....	ix
<b>LIST OF FIGURES</b> .....	xi
<b>LIST OF PLATES</b> .....	xii
<b>LIST OF ABBREVIATION</b> .....	xiii
<b>LIST OF APPENDIXES</b> .....	xiv
<b>ABSTRACT</b> .....	xv
<b>ABSTRAK</b> .....	xvi
<b>CHAPTER ONE : INTRODUCTION</b> .....	1
<b>1.1 Background Information</b> .....	1
<b>1.2 Problem Statement</b> .....	3
<b>1.3 Study Justification</b> .....	4
<b>1.3 Study Objective</b> .....	5
<b>1.3.1 General Objective</b> .....	5
<b>1.3.2 Specific Objectives</b> .....	5
<b>1.4 Study Hypothesis</b> .....	5
<b>1.5 Conceptual Framework</b> .....	6
<b>1.7 Operational Definitions</b> .....	7
<b>CHAPTER TWO : LITERATURE REVIEW</b> .....	8
<b>2.1 DEFINITION</b> .....	8
<b>2.1.1 Definition of Vegetables</b> .....	8
<b>2.1.2 Definition of Soil</b> .....	10
<b>2.1.3 Definition of Irrigation Water</b> .....	10

## **Abstract**

### **Assessment of Heavy Metal Contamination in Irrigation Water, Soils and Vegetables in Meru Vegetable Farm**

**FATIN NURASYIKEEN BINTI KAMALDEEN**

This study was conducted to analyze the heavy metal concentration in selected vegetables which consists of Green Spinach, Water Spinach and Sweet Leaf Bush vegetables, along with their soils and irrigation water. This study was conducted at Meru Vegetables Farm. This study design is cross-sectional study. The sample will be analyzed for concentration Cadmium (Cd), Copper (Cu), Chromium (Cr), Iron (Fe), Lead (Pb), and Zinc (Zn), using Graphite Furnace Atomic Absorption Spectrophotometer (GFAAS) Model PinAAcle 900T to determine the heavy metals. Dry-ashing technique was used for sample digestion. The mean concentration for each heavy metal in the samples gotten which including three types of vegetables, their soils and irrigation water from Meru Vegetables Farm and compared with permissible level set by the Malaysia Food Act 1983 and Food Regulation 1985, USEPA Contaminated Land Management and Control Guideline 1 and Third Schedule Environmental Quality Act 1974 Environmental Quality (Sewage and Industrial Effluents) Regulations 1979. From the analysis of irrigation water showed that heavy metals of Iron (Fe) and Lead (Pb) are exceeding the prescribed limit. In soil of Green Spinach vegetables showed that all the heavy metals analyzed are within the prescribed limit. Heavy metals of Cadmium (Cd), Lead (Pb) and Zinc (Zn) are exceeding the prescribed limit in soil of Water Spinach vegetables. In soil of Sweet Leaf Bush vegetables showed that Cadmium (Cd) and Lead (Pb) are exceeding the safe limit. Then, in vegetables of Green Spinach showed that only heavy metals of Iron (Fe) exceeding the limit value. In the Water Spinach and Sweet Leaf Bush, all the heavy metals of Iron (Fe), Cadmium (Cd), Chromium (Cr), Lead (Pb) and Zinc (Zn) are above the limit value, except for Copper (Cu). Concentration and daily intake (EDI) of heavy metals (Pb, Cd, Zn, Fe, Cr, and Cu) are investigated and their potential health risk for consumption of vegetables is simultaneously evaluated by calculating their potential health risk. Health Risk Assessment was calculated and it shows that hazard index is more than 1 except Cu. The contamination of heavy metals in soils gives potential risk to vegetables there. Health risk assessment indicates that vegetables from Meru Vegetables Farm are not safe for consumption.

**Keyword:** Heavy metal, Selected Vegetable, Soil, Irrigation Water, Health Risk Assessment