

UNIVERSITIT TEKNOLOGI MARA

**A STUDY OF HEAVY METALS IN
VEGETABLES PRODUCT AND ITS
HEALTH RISK ASSESSMENT**

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TABLE OF CONTENTS

DECLARATION BY STUDENT	i
INTELLECTUAL PROPERTIES	ii
APPROVAL BY SUPERVISOR	v
ACKNOWLEDGEMENT	vi
TABLE OF CONTENT	vii
LIST OF TABLES	xii
LIST OF FIGURES	xiii
ABSTRACT	xiv
CHAPTER 1: INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	3
1.3 Objective of study	
1.3.1 General objective	5
1.3.2 Specific objectives	5
1.4 Hypothesis	5
1.5 Significant of the study	6
CHAPTER 2: LITERATURE REVIEW	
2.1 Introduction	7
2.2 Heavy metals tested in the experiment	8
2.2.1 Cadmium	9
2.2.2 Copper	11
2.2.3 Manganese	13
2.2.4 Zinc	15
2.3 Canning process	17

ABSTRACT

This study aimed to determine heavy metal concentration which are cadmium (Cd), copper (Cu), manganese (Mn) and zinc (Zn) in vegetable product which are dried vegetables, canned vegetables and tomato paste. The sample preparation method that is used for this study is wet digestion and being analyzed by using Atomic Absorption Spectroscopy (AAS). After that, SPSS software been used for statistical method. For dried vegetables, the range concentration level for cadmium, copper, manganese and zinc is 0.913 – 3.477 ppm, 0.317 – 5.627 ppm, 1.65 – 9.253 ppm and 2.41 – 17.89 ppm respectively. For canned vegetables, the range concentration level for cadmium, copper, manganese and zinc is 0.63 – 1.03 ppm, 2.4 – 5.53 ppm, 10.32 – 12.17 ppm and 13.08 – 20.05 ppm respectively. For tomato paste, the range concentration level for cadmium, copper, manganese and zinc is 0.417 – 0.725 ppm, 0.9 – 3.092 ppm, 4.767 – 7.967 ppm and 2.1 – 7.425 ppm.

CHAPTER ONE

INTRODUCTION

1.1 Background of study

Heavy metals are natural components of the Earth's crust that cannot be degradable even over period of time. Heavy metals can enter our bodies via food, drinking water and air in the small extents. Thus, they can be involved in the food chain with bioaccumulation of these toxic substances (Suruchi & Khanna, 2011; Massouda, Rasoul, Pegah, Kianoush, & Darani, 2019). Later on, the enriched heavy metals finally can be absorbed into the human body. As trace elements, some heavy metals such as copper, selenium, zinc and several others are essential to maintain the metabolism of the human body and necessary for life activities. Many of these metals are essential in living organisms (Tuzen & Mustafa, 2007; Dallatu, Abechi, Abba, Mohammed, & Ona, 2013). However, surpass the certain threshold and higher concentration of consumption and exposure, all the metal elements can be poisoning and fatality. Nevertheless, a considerable number of them are harmful to plants, animals and man even at low concentration. This is particularly true of heavy metals such as mercury (Hg), arsenic (As), copper, cadmium (Cd) and lead (Pb) are discharged into the atmosphere, water and soil (Järup, 2003; Nadal, Bocio, Schuhmacher, & Domingo, 2005).

The international trade in processed vegetables and vegetable product is very vast with a large number of different types being processed and exported. Whereas once, processing was limited to mostly temperate climate vegetables, the change has now broadened to include tropical and subtropical types. This is because consumers' dietary habits have become more diverse so that, for example people living in America or Europe may very well like vegetables grown in Africa or Asia and vice-versa (Tuzen & Mustafa,