

UNIVERSITI TEKNOLOGI MARA

**HEAVY METAL CONCENTRATION IN SOILS
AND SELECTED TROPICAL FRUITS AND
THEIR POTENTIAL HEALTH RISKS**

NOR ASILAH BINTI AZMI

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

Faculty of Health Sciences

July 2018

DECLARATION BY STUDENT

Project entitled “heavy metal concentration in soils and selected tropical fruits and their potential health risks” 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, Prof Madya Rodziah binti Ismail. 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).

Student’s signature:

.....

(Nor Asilah binti Azmi)

2014835176

940617-06-5796

Date:

ACKNOWLEDGEMENT

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

Assalamualaikum and all praised to Allah S.W.T, the Almighty of the Universe, the Most Gracious and Merciful. A peace and blessing to our Prophet Muhammad S.A.W and all his family. Alhamdulillah and thank you God for the strength, health and determination to be granted for me in order to finish and complete this study.

I am deeply grateful and thousands of thanks to my parents, Azmi bin Md Yusof and Nor Hayati binti Nik Abdullah for their prayer, hopes and support as well as being a backbone to encourage me to complete what I have started. Special appreciation of thanks I dedicate to my dearest supervisor, Prof Madya Rodziah binti Ismail for her time and efforts in order to motivate and guide me along the journey from the starts till the end of this study. Not to forget to all lecturers and staffs for Department of Environmental Health and Safety, Faculty of Health Science for their experience, knowledge and handful helps whenever I need an assistance.

I would love to express an appreciation to all staff in Selangor Fruits Valley at Bestari Jaya and all individuals that involved in this project who willingly to give me a full cooperation and permission for me to run the study within the timeline. Last but not least, a warmest gratitude to my dearest colleagues, for your full support, helps and cares among each other to survive and complete our journey till the end. Personally I appreciate and thank all those who involved and participate directly and indirectly in the success of this study. Thank You.

TABLE OF CONTENTS

TITLE PAGE

DECLARATION BY STUDENTS

INTELLECTUAL PROPERTIES

APPROVAL BY SUPERVISOR

ACKNOWLEDGEMENT

TABLE OF CONTENTS.....i

LIST OF TABLES..... vi-vii

LIST OF FIGURES.....viii

LIST OF EQUATION.....ix

LIST OF ABBREVIATIONS.....x

ABSTRACT..... xi

ABSTRAK.....xii

CHAPTER ONE: INTRODUCTION 1

1.1 Study Background 1-2

1.2 Problem Statement 2-3

1.3 Significant study 3-4

1.4 Objectives 4

1.4.1 General objective 4

1.4.2 Specific objective 4

1.5 Study hypothesis 5

ABSTRACT

Background information: Agricultural activities can contribute heavy metals contamination in soils and food crops through an application of fertilizers and pesticides. Consumers of food crops from the study area might expose to health risk through consumption of these food crops. The purpose of this study is to determine the concentration of heavy metals in soils and selected tropical fruits at Bestari Jaya, to compare the concentration of heavy metals between selected tropical fruits, and to evaluate the health risk among consumers of selected tropical fruits at Bestari Jaya.

Methodology: Thirty samples of tropical fruits (mango, guava and starfruit) and five samples of soil from corresponding tropical fruits plot were randomly selected for sampling and become were duplicated to make a total samples of 70. Heavy metals like Zinc (Zn), Copper (Cu), Lead (Pb) and Cadmium (Cd) were selected for heavy metals analysis by using Atomic Absorption Spectrophotometer (AAS) Perkin-Elmer Model Analyst 900.

Results: This study shows that there was a presence of heavy metal in soils and selected tropical fruits. There was significant difference between heavy metals concentration in selected tropical fruits studied ($p < 0.05$). Different concentration of heavy metals in these fruits might due to soil properties and also uptake mechanism by food crops. Zinc has the highest concentration and followed by copper and lead in tropical fruits. Cadmium was not detected in all soil and tropical fruits samples. No health risk concern through consumption of selected tropical fruits since HI was below than one ($HI < 1$).

Conclusion: As a conclusion, continuous monitoring should be done as heavy metals might accumulate in food crops overtime and remediation on contaminated soil by heavy metals should be practiced.

Keywords: Heavy metal, agricultural soil, tropical fruits, health risk assessment