

UNIVERSITI TEKNOLOGI MARA

**THE EFFECTS OF SECONDARY
TREATED WASTEWATER ON
VEGETABLE GROWTH UNDER
SOIL AND SOILLESS CULTURE**

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Civil Engineering

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

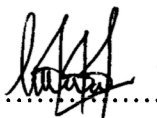
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ABSTRACT

This study highlighted the effects of secondary treated wastewater to macronutrients and trace elements availability in mustard greens grown under soil and soilless culture. Higher macronutrients and trace elements concentrations were found in FSTW as compared to BSTW suggested seasonal variations and treatment system efficiency affected wastewater quality. The application of FSTW and BSTW for irrigation has significantly contributed to soil fertility and toxicity with most of macronutrients, micronutrients and beneficial elements being absorbed by plants for physiological activities otherwise interacted in soil particularly trace elements. Besides, higher macronutrients and trace elements level were measured in plant grown under soilless as compared to soil culture suggested soil media as good filter for potentially toxic elements removal while soilless media have a greater metal tolerance. Meanwhile, the DIM and HRI conducted shown children were highly exposed to risk as compared to adults suggested that former may be vulnerable towards macronutrients and trace elements due to influence of assumed body weight and consumption rates. Nevertheless, the HRI indicated values was <1 and concluded plants are safe to be consumed by adults and children. In addition, higher plants heights, diameter and number of leaves were observed in plant grown under soil as compared to soilless culture suggested that role of soil as trace elements filter for plant uptake. Hence, the application of FSTW and BSTW has a potential application to irrigation crops with continuous monitoring in order to assess possible detrimental effects to human and environmental resulted from short and long term irrigation.

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TABLE OF CONTENTS

AUTHOR'S DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	xi
LIST OF FIGURES	xvi
LIST OF EQUATIONS	xviii
LIST OF ABBREVIATIONS	xix
LIST OF SYMBOLS	xxi
CHAPTER ONE : INTRODUCTION	1
1.1 Background of the Study	1
1.2 Problem Statement	3
1.3 Objectives of the Study	5
1.4 Definition of Terms	6
1.5 Scope of the Study	6
1.6 Limitation of the Study	8
1.7 Significance of the Study	9
1.8 Organisation of the Thesis	10
CHAPTER TWO : THE REVIEW OF LITERATURE	11
2.1 Introduction	11
2.2 Wastewater Reuse in Agriculture	11
2.3 Standards, Regulations and Guidelines for Wastewater Reuse	13
2.4 Composition of Wastewater	16
2.5 Roles and Physiological Functions of Macronutrients and Trace Elements in Soils and Plants	18
2.5.1 Macronutrients	18
2.5.1.1 Nitrogen (N)	19
2.5.1.2 Phosphorus (P)	21