

**REMOVAL OF HEAVY METAL FROM AQUEOUS SOLUTION
BY APPLE RESIDUES**

NORLIATI MOHAMED NAKMAN

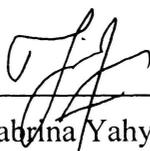
**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Applied Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA**

MAY 2010

The Final Year Project Report entitled **“Removal of Heavy Metal From Aqueous Solution By Apple Residues”** was submitted by Norliati Mohamed Nakman, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by:



Associate Professor Hj. Zainuddin Hashim
Supervisor
B.Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Miss Sabrina Yahya
Project Coordinator
B.Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Dr. Siti Halimah Sarijo
Head of Programme
B.Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: _____

ACKNOWLEDGEMENT

In the name of Allah the Most Compassionate and the Most Merciful.

I am very grateful to Allah S.W.T who gives me the strength and perseverance to complete this thesis project within the given time. Without His guidance I am not able to complete my thesis project as a requirement of my course syllabus

First and foremost, I would like to express my gratitude and appreciation to my supervisor, Associate Professor Hj Zainuddin B Hashim for his guidance, continuous encouragement and support and gives me ideas in order for me to complete my final year project.

Last but not least, I would like to thank to my beloved family and friends for their moral support, cooperation and encouragement during my study in UiTM

TABLE OF CONTENT

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLE	v
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1 INTRODUCTION	
1.1 Background	1
1.2 Significance of Study	5
1.3 Objective of Study	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Contamination of Wastewater by Inorganic Substances	6
2.2 Heavy Metals	9
2.2.1 Cadmium	10
2.2.2 Chromium	12
2.2.3 Lead	13
2.3 Agricultural Wastes as an Bioadsorbents	15
2.4 Atomic Absorption Spectroscopy	17
CHAPTER 3 METHODOLOGY	
3.1 Materials	19
3.1.1 Instrumentation	19
3.1.2 Apparatus	19
3.1.3 Chemical	19
3.2 Methods	20
3.2.1 Sample Preparation	20

ABSTRACT

REMOVAL OF HEAVY METAL FROM AQUEOUS SOLUTION BY APPLE RESIDUES

This study is carried out to investigate the ability of apple residues to remove heavy metal from aqueous solution. Apple residues are considered as one of the agricultural wastes can be used as adsorbents. The optimum condition in the removal of lead, cadmium and chromium by apple residues was studied by varying all parameters which affect the biosorption of apple residues on heavy metals. These include optimum pH of biosorption, effect of adsorbent dosage and effect of initial metal concentration. The sample then was analyze using Atomic Absorption Spectrometer .