

UNIVERSITI TEKNOLOGI MARA

**ANTI-HYPERCHOLESTEROL
EFFECTS OF *Gynura procumbens*
LEAVES AQUEOUS EXTRACT ON
CHOLESTEROL-FED NEW
ZEALAND WHITE RABBITS**

MOHD AZRUL HISHAM BIN ISMAIL

Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science

Faculty of Health Sciences

September 2016

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 results 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.

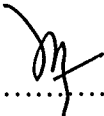
Name of Student : Mohd Azrul Hisham Bin Ismail

Student I.D. No. : 2013448212

Programme : Master of Science (Physiology) – HS750

Faculty : Faculty of Health Sciences

Thesis Title : Anti-hypercholesterol Effects of *Gynura procumbens* Leaves Aqueous Extract on Cholesterol-fed New Zealand White Rabbits.

Signature of Student : 

Date : September 2016

ABSTRACT

Atherosclerosis becomes premier cause of CVD related diseases and become major concern worldwide. *Gynura procumbens* or Sambung Nyawa contains active chemical constituents such as flavonoids, saponins, tannins, terpenoids and sterol glycosides which can be further highlighted on its possible therapeutic potential as phytomedicine alternatives towards prevention of degenerative diseases. The study was conducted to determine the effects of *Gynura procumbens* leaves aqueous extract in hypercholesterolemic-induced rabbits. Antioxidant capacities were measured via DPPH and FRAP assays, determination of total phenolic and total flavonoid content and also proximate analysis assessment. The extract showed antioxidant capacities, radical scavenging activities and contains nutritional composition. New Zealand White rabbits were induced with 0.5 % high cholesterol diets for 10 weeks. To study the hypercholesterol lowering effects of *Gynura procumbens* leaves aqueous extract, rabbits that induced with high cholesterol diets were given 100 mg/kg, 200 mg/kg and 400 mg/kg. Effects of *Gynura procumbens* extract on New Zealand White rabbits were studied by measuring its enzymatic antioxidants (SOD, GPX and CAT), lipid profiles (TC, TG, HDL and LDL), liver function test (ALP, ALT, AST and GGT), lipid peroxidation (MDA) and also histological changes (Sudan IV and H&E). After 10 week of treatment, significance increased ($p < 0.05$) of serum lipid profiles, liver function test and lipid peroxidation were observed in rabbits that were induced with high cholesterol diets. Lipid profiles, liver function test and lipid peroxidation levels of groups that have been given high cholesterol diets with supplementation of the extract show significance reduction ($p < 0.05$) compared to animals that have been only given high cholesterol diets. Enzymatic antioxidant activities of rabbits that have been given the extracts also show lower levels of SOD, GPX and CAT levels compared to HCD group. Histological study of the aorta shows that treatments with *Gynura procumbens* extract reduced the formation of the plaque in the aorta. The findings suggest that *Gynura procumbens* possesses potential antioxidant capacity and nutritional composition that may be beneficial factors in treating various types of diseases including cardiovascular diseases especially in reducing the risk of atherosclerosis.

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim.

In the name of Allah, the Most Gracious and the Most Merciful who had imparted me His blessing in completing this study successfully.

I would like to thank everyone for making this work possible. A very special thank you I would like to give to my beloved supervisor, Prof. Dr. Zulkhairi bin Hj. Amom for giving me the opportunity to work on this interesting project. Special thanks also are dedicated to Mrs. Farrah Shafeera binti Ibrahim for the contributions in this study. Thank you for both of you who give supports guidance and advices from the moments I started my study until the end of my study.

My heartfelt thanks go to my beloved family for the endless support and encouragement and they always stand next to me to help and to spread the positive vibe for me during the study.

I am sincerely value and always be thankful to my fellow friends. Thank you from the bottom of my heart.

Millions of appreciation given to various faculty/institutions (Faculty of Health Sciences UiTM, Faculty of Pharmacy UiTM, Faculty of Medicine UiTM, FRIM and others) that have indeed assisted me along my journey to complete this study. Thank you so much.

Last but not least, when there is a will, there is a way. Strive for excellence!

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENT	vi
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF SYMBOLS	xiv
LIST OF ABBREVIATIONS	xvi
CHAPTER ONE: INTRODUCTION	1
1.1 Research Background	1
1.2 Problem Statement	2
1.3 Research objectives	3
1.3.1 General Objective	3
1.3.2 Specific Objectives	3
1.4 Scope of the Study	3
1.5 Significance of Study	4
CHAPTER TWO: LITERATURE REVIEW	5
2.1 Oxidative Stress	5
2.1.1 Free Radicals	6
2.1.2 Reactive Oxygen Species (ROS)	8
2.1.3 Reactive Nitrogen Species (RNS)	12
2.2 Hypercholesterolemia	13
2.2.1 Cholesterol	13
2.2.2 Lipid Peroxidation	17
2.3 Atherosclerosis	20
2.3.1 Normal Artery	21
2.3.2 Development of Atherosclerosis	23