UNIVERSITI TEKNOLOGI MARA

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

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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.

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CHAPTER ONE
INTRODUCTION

1.1 RESEARCH BACKGROUND

Hypercholesterolemia or high level of cholesterol in circulation has been identified as one of the predisposing factor for chronic health diseases in most industrial and developed countries. It has been well documented that hypercholesterolemia could promotes cardiovascular diseases (CVD), peripheral vascular diseases (PVD) and coronary artery diseases (CAD) (Stapleton et al., 2010). Statistics disclosed that approximately 6.91 % or 147,843 cases from hospital admission were due to CVD which recorded 24.5 % death in Malaysian's government hospitals (Lu & Nordin, 2013). Hypercholesterolemia primarily acts as a foundation to increasing possibilities of atherosclerosis.

According to Frostegård, (2013), atherosclerosis that located in the intima of many arteries either in middle sized or large sized has become premier cause of CVD related diseases. Atherosclerosis or hardening of arteries was formed when the arteries became narrowed due to plaque formation which leads to unstable blood flow through the lumen. Atherosclerotic plaques were formed in the lining of arteries due to oxidation of cholesterol transporting lipoproteins that accumulated in the arterial wall which lead to the narrowing of artery. The plaque will lead to thrombosis when exceptionally high extracellular and intracellular lipid depositions were ruptured due to high pressure of blood are passing through the arteries (Badimon et al., 2012). This alarming concern on hypercholesterolemia induced atherosclerosis has led to a finding of natural resources which possess capability as anti-hypercholesterolemia.

Amran et al., (2012) reported that various types of herbs such as *Piper sarmentosum* which contain phytochemical properties have been vigorously studied and intriguingly have demonstrated potential effects against hypercholesterol. In the same way, *Gynura procumbens* (Lour.) Merr or *Sambung Nyawa* which contains active chemical constituents such as flavonoids, saponins, tannins, terpenoids and