UNIVERSITI TEKNOLOGI MARA

STUDY ON *MYRMECODIA PLATYTYREA ANTOINII* TUBER AND ITS POTENTIAL BENEFITS IN PREVENTING HYPERCHOLESTEROLEMIA RELATED DISEASES

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ABSTRACT

This study was designed in order to investigate the effect of *Myrmecodia platytyrea* (*MyP*) extract as an anti-hypercholesterolemic agent. The acute toxicological test was done by administration of single dose and followed by 14 days observation on the rat. The subchronic toxicological test was done by administration of 28 days repeated dose. Both tests showed that *MyP* water extract was not toxic. The bioassay-guided isolation revealed that the *MyP* water extract containing 2-(2-methylbutyryl) phloroglucinol glucoside which reduced 3-hydroxy-3-methylglutaryl-CoA reductase (HMGR) activity ($p<0.05$) with inhibition concentration 50 (IC_{50}) of 75 µg/ml. Besides that, polysaccharide showed effective concentration 50 (EC_{50}) of 50.5 µg/ml for bile acid binding. Meanwhile, rutin actively decreased pancreatic lipase activity with IC_{50} of 130 µg/ml. Moreover, in vivo study results showed that treatment of *MyP* water extract can significantly reduce ($p<0.05$) low-density lipoprotein (LDL) compared to negative control group. The extract significantly increased ($p<0.05$) high-density lipoproteins (HDL) concentration compared to negative control group. In addition, *MyP* water extract increased faecal cholesterol and faecal bile compared to normal control group. Lipid peroxidation was significantly decreased ($p<0.05$) in *MyP* water extract treatment group. The extract also decreased the formation of the fatty streak at the aorta and significantly decreased ($p<0.05$) the thickness of foam cell in high cholesterol diet (HCD) induced rat. Then, cell culture study using WRL-68 cell showed *MyP* water extract significantly increased ($p<0.05$) apo lipoprotein A-I (Apo A-I), scavenger receptor – B1 (SR-B1) and lecithin: cholesterol acyltransferase (LCAT). The extract can significantly reduce ($p<0.05$) lipid droplet formation. Furthermore, *MyP* water extract also significantly increased ($p<0.05$) the superoxide dismutase (SOD) and catalase (CAT) enzymes. In the molecular study, polymerase chain reaction (PCR) array was performed on the 84 genes that specifically involved with lipoprotein signalling and cholesterol metabolism. The result showed that the treatment of *MyP* water extract can increase the gene expression related to reverse cholesterol transport (RCT) process. The treatment of *MyP* water extract did not up-regulate the gene expression of CYP7A1which is important in the transformation process of bile acid from cholesterol. Therefore, it was suggested that *MyP* water extract only acted on the bile acid itself and not through up-regulation of bile acid transformation related genes. It was suggested that the bioactive compound's synergistic effects which are present in *MyP* water extract also acted as antioxidant and anti-inflammatory. It was concluded that *MyP* water extract might play an important role in the prevention of hypercholesterolemia related diseases.

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