Mikania micrantha extract inhibits HMG-CoA reductase and ACAT2 and ameliorates hypercholesterolemia and lipid peroxidation in high cholesterol-fed rats

ABSTRACT

The present study aimed to determine the effect of an ethyl acetate extract of Mikania micrantha stems (EAMMS) in hypercholesterolemia-induced rats. Rats were divided into a normal group (NC) and hypercholesterolemia induced groups: hypercholesterolemia control group (PC), simvastatin group (SV) (10 mg/kg) and EAMMS extract groups at different dosages of 50, 100 and 200 mg/kg, respectively. Blood serum and tissues were collected for haematological, biochemical, histopathological, and enzyme analysis. Total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), aspartate aminotransferase (AST), alanine aminotransferase (ALT), urea, creatinine, malondialdehyde (MDA) level, as well as enzymes of HMG-CoA reductase (HMGCR) and acetyl-CoA acetyltransferase 2 (ACAT2), were measured. Feeding rats with high cholesterol diet for eight weeks resulted in a significantly ($p < 0.05$) increased of TC, TG, LDL-C, AST, ALT and MDA levels. Meanwhile, the administration of EAMMS extract (50, 100 and 200 mg/kg) and simvastatin (10 mg/kg) significantly reduced ($p < 0.05$) the levels of TC, TG, LDL-C and MDA compared to rats in the PC group. Furthermore, all EAMMS and SV-treated groups showed a higher HDL-C level compared to both NC and PC groups. No significant difference was found in the level of ALT, AST, urea and creatinine between the different dosages in EAMMS extracts. Treatment with EAMMS also exhibited the highest inhibition activity of enzyme HMGCR and ACAT2 as compared to the control group. From the histopathological examination, liver tissues in the PC group showed severe steatosis than those fed with EAMMS and normal diet. Treatment with EAMMS extract ameliorated and reduced the pathological changes in the liver. No morphological changes showed in the kidney structure of both control and treated groups. In conclusion, these findings demonstrated that EAMMS extract has anti-hypercholesterolemia properties and could be used as an alternative treatment for this disorder.

Keyword: Mikania micrantha; Anti-hypercholesterolemia; Lipid profile; Steatosis; Nutraceuticals