Functional food mixtures: inhibition of lipid peroxidation, HMGCoA reductase, and ACAT2 in hypercholesterolemia-induced rats

ABSTRACT

Mixtures of selected functional foods (MSFF) were composed of nattokinase (fermented soybean), red yeast rice extract, Ginkgo biloba, oat fiber, garlic, bee pollen, and propolis as anti-hypercholesterolemic were studied. The goal of this study was to determine the bioactive compounds in these mixtures and their cholesterol-lowering potential effects (biochemical profiles, lipid peroxidation, liver tissue histopathology, and enzymatic activity analysis; HMGCoA reductase and ACAT2. The LC-MS/MS analysis showed that bioactive compounds such as Monacolin K, naringin, tocopherol, and glutamate, which have potential as anti-hypercholesterolemic agents, were present in these functional food mixtures. MSFF supplementation at 50 mg/kg 100 mg/kg and 200 mg/kg showed substantial reductions in serum lipid profiles (TC and LDL) ($p < .05$). The serum liver profiles of AST (115.33 ± 8.69 U/L) and ALT (61.00 ± 1.00 U/L) were significantly reduced ($p < .05$) with MSFF supplementation at 200 mg/kg. MDA lipid peroxidation has also decreased significantly ($p < .05$) in serum (3.69 ± 0.42 µmol/L) and liver (15.04 ± 0.97 µmol/mg) tissues and has been shown to protect against hepatic steatosis. The significant ($p < .05$) inhibition activity of HMGCoA reductase (163.82 ± 3.50 pg/ml) and ACAT2 (348.35 ± 18.85 pg/ml) was also attributed by the supplementation of MSFF at 200 mg/kg.

Keyword: ACAT2; Bioactive compounds; Functional foods; HMGCR; Hypercholesterolemia; Lipid peroxidation