

**Effects of Rhodiola extract supplementation on blood lipid concentrations and anti-oxidant status in rats fed high-sucrose or high-fat diets**

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Rhodiola (*Rhodiola sachalinensis*) which grows on Baek-du mountain at 1,800 m altitude have been used as a herbal medicine to cure fatigue and hypertension, and aging or a tonic agent. In a recent report its methanol extract was shown to have very high *in vitro* Superoxide Dismutase (SOD)-like activity. To explain further the basis of the traditional medical use of Rhodiola roots, its preventative effects against blood dyslipidemia and anti-oxidant effects were investigated. Dyslipidemic conditions were simulated by feeding rats with high-sucrose or high-saturated-fat diets. Five-week old Sprague-Dawley rats were divided into six groups and fed modified AIN 96G diets. The two control groups were fed control low fat, low sucrose diets, and one of them was supplemented with 300 mg per kg body weight with Rhodiola extract for 4 weeks. The two high sucrose groups were fed high sucrose (56% w/w), and one of them was supplemented with Rhodiola extract. The two high fat groups were fed high lard (33% energy basis), and one of them was supplemented with Rhodiola extract. At the end of 4 weeks rats were fasted for 14hr and anesthetized, and blood was drawn from the portal vein and plasma was prepared by centrifugation and stored at  $-80^{\circ}\text{C}$  prior to analysis. Plasma lipid contents were measured enzymatically. The TBARS contents were measured by the modified method of Masugi and Nakamura using 1.1.3.3-tetraethoxypropane as a standard. Catalase activities were determined following  $\text{H}_2\text{O}_2$  reduction at 240 nm. CuZnSOD activities of cytosol fractions were measured on the basis of its inhibitory action on the rate of superoxide formation of xanthine:xanthine oxidase. MnSOD activities of microsomal fractions were determined using the above method in the presence of KCN to inhibit CuZnSOD activities. The high-sucrose and high-fat diets elevated the concentration of plasma total triacylglycerol concentrations relative to control diet level, but supplementing Rhodiola lowered the triacylglycerol concentrations. Total cholesterol or HDL-cholesterol were not significantly affected by supplementing Rhodiola extract. The free-radical scavenging effect of PE was evaluated in rats fed high-sucrose or high-fat diets. The effect of the accumulation of TBARS and activities of catalase from the liver microsomal fractions were not altered by the administration of Rhodiola extract. However, Rhodiola extract elevated activities of the anti-oxidative enzymes, CuZnSOD and MnSOD in high-sucrose fed rats. This study suggests that Rhodiola supplementation may protect in part the oxidative stress caused by feeding high-sucrose diet.