

Anti-visceral obesity and antioxidant effects of powdered sea buckthorn (*Hippophae rhamnoides* L.) leaf tea in diet-induced obese mice

- Hae-In Leea, • Mi-Su Kima, • Kyung-Mi Leeb, • Seok-Kyu Parka, • Kwon-II Seoa,
- Hye-Jin Kimc, • Myung-Joo Kimd, • Myung-Sook Choie, • Mi-Kyung Leea,

Abstract

The potential health benefits of tea have long been studied. This study examined the role of powdered sea buckthorn leaf tea (SLT) in high-fat diet-induced obese mice. The mice were fed two different doses of SLT (1% and 5%, wt/wt) for six weeks. SLT suppressed body weight gain in a dose-dependent manner and significantly reduced visceral fat, plasma levels of leptin, triglyceride and total cholesterol and ALT activity compared with the high-fat-fed control mice. SLT also decreased hepatic triglyceride and cholesterol concentrations and lipid accumulation, whereas elevated fecal lipid excretion. High-fat feeding resulted in simultaneously decreasing hepatic FAS and G6PD activities and increasing PAP, β -oxidation and CPT activities. However, SLT supplementation during high-fat feeding led to a significant decrease in PAP, β -oxidation and CPT activities with a simultaneous increase in G6PD activity. The hepatic CYP2E1 activity and hepatic and erythrocyte lipid peroxides were significantly lowered with SLT supplements. Hepatic and erythrocyte SOD and CAT activities were also increased with SLT supplements in a dose-dependent manner, whereas GSH-Px activity was increased in erythrocytes only.

These results indicate that SLT has potential anti-visceral obesity and antioxidant effects mediated by the regulation of lipid and antioxidant metabolism in high-fat diet-induced obese mice.

Highlights

- Sea buckthorn leaf tea (SLT) has potential anti-visceral obesity properties in mice. ► The anti-obesity action of SLT may not be due to its appetite-suppressing property. ► The SLT supplementation seems to inhibit hepatic triglycerides synthesis. ► The SLT enhances antioxidant defense system and attenuates CYP2E1 induction.

Abbreviations

- ALT, alanine aminotransferase;
- CAT, catalase;
- CPT, carnitine palmitoyltransferase;
- CYP2E1, cytochrome P450 2E1;
- DTNB, 5,5'-dithiobis (2-nitrobenzoate);
- EDTA, ethylenediamine tetraacetic acid;
- HDL-C, HDL-cholesterol;
- FAS, fatty acid synthase;
- G6PD, glucose-6-phosphate dehydrogenase;
- GSH-Px, glutathione peroxidase;
- MDA, malondialdehyde;
- ME, malic enzyme;

- β -oxidation, fatty acid β -oxidation;
- PAP, phosphatidate phosphohydrolase;
- SLT, sea buckthorn leaf tea;
- SOD, superoxide dismutase;
- TC, total cholesterol;
- TG, triglyceride

Keywords

- Antioxidant metabolism;
- Lipid metabolism;
- Sea buckthorn (*Hippophae rhamnoides*);
- Visceral obesity