

Effects of soy isoflavone supplementation on plasma glucose, lipids, and antioxidant enzyme activities in streptozotocin-induced diabetic rats

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Abstract

This study was designed to examine the effects of feeding diets containing different levels of isoflavone on plasma glucose, insulin concentrations, and lipid profiles as well as tissue antioxidant enzyme activities in diabetic rats. Diabetes was induced in the rats with streptozotocin. Diabetic rats were further assigned to I control group and 3 experimental groups (ISO-1, ISO-2, and ISO-8). The control group received a casein-based diet without isoflavone, whereas the ISO-1, ISO-2, and ISO-8 groups received a similar diet but supplemented with 1, 2 and 8 times of isoflavone equivalent of normal human consumption as suggested by the manufacturer. All diets were adjusted to contain identical nutrients and were maintained for 24 days. Fasted and non-fasted blood was drawn after feeding for 21 and 24 days, respectively, and blood chemistry was analyzed. The liver, lung, and kidney were excised after sacrifice, and antioxidant enzyme activities and lipid peroxidation products were measured. The results demonstrate that there were no differences in plasma glucose or insulin levels among groups, regardless of whether rats had fasted or not. However, hemoglobin A(1c) tended to be lower in the ISO-2 group than in the control and the ISO-1 groups. Plasma total cholesterol and low-density lipoprotein-cholesterol were significantly lower in the ISO-8 group than in the other groups. No differences in plasma triglyceride or high-density lipoprotein-cholesterol were observed among groups in the non-fasting state. There were no significant differences in superoxide dismutase, glutathione peroxidase activities, and malondialdehyde concentrations in liver, lung, and kidney homogenates among groups. These results suggest that 3 doses of isoflavone supplementation had no favorable effect on plasma glucose or insulin concentrations, nor had any influence on attenuating oxidative stress in diabetic rats. However, the ISO-2 group tended to have better chronic glycaemic control than did the control and the ISO-1 group. In addition, a larger amount of isoflavone supplementation had beneficial effects on reducing plasma total cholesterol and low-density lipoprotein-cholesterol levels.