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## **Beneficial effects of a methanolic extract of *Globularia alypum* on glycaemia, lipid peroxidation and antioxidant enzymes activities in rats with streptozotocin-induced diabetes**

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Diabetes mellitus is a major risk factor for cardiovascular complications. The present study was designed to investigate the possible hypoglycaemic, hypolipidaemic and antioxidant effects of a lyophilised methanolic extract of *Globularia alypum* L. (*Ga*).

Twenty rats with diabetes were divided into two groups that were fed a casein diet either with or without a *Ga* supplement for 28 d. Diabetes was induced in the rats by administration of a single dose of streptozotocin (50 mg/kg; intraperitoneally). Plasma total cholesterol (TC), TAG, VLDL-LDL-TC and HDL-TC and the content of final lipid peroxidation products reacting with thiobarbituric acid (TBARS) in several tissues, as well as the concentration of reduced glutathione (GSH) and antioxidant enzyme activities were evaluated.

A significant reduction in plasma glucose was observed in rats treated with *Ga* (5.21 (SE 0.83) mmol/l) compared with untreated rats (27.4 (SE 0.21) mmol/l). TC, VLDL-LDL-TC and TAG were respectively 1.3-, 1.8- and 1.6-fold higher for *Ga*-treated rats than for untreated rats, whereas there was no significant difference in HDL-TC. Compared with the untreated group TBARS were diminished by 43, 51, 42 and 23% in liver, heart, brain and kidney respectively in the *Ga*-treated group, although in adipose tissue and gastrocnemius muscle the concentrations were similar for both groups. GSH levels were increased by 40, 25 and 36% in liver, brain and kidney respectively, whereas values in heart and muscle were similar. In liver and kidney superoxide dismutase (SOD), GSH peroxidase (GSH-Px), glutathione reductase and catalase (CAT) activities were increased significantly in *Ga*-treated rats compared with untreated rats ( $P < 0.05$ ). Moreover, for *Ga*-treated rats SOD activity was increased by 22% in muscle, while GSH-Px and CAT activities were 1.3- and 1.4-fold higher in heart compared with untreated rats.

Administration of *Ga* to rats with diabetes leads to lower glycaemia and plasma lipids. Moreover, this plant exerts a beneficial action against tissue lipid peroxidation by enhancing antioxidant enzyme activities.