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CORNELIAN CHERRY FRUIT EXTRACTS AND ERYTHROCYTE GLUCOSE CATABOLITES IN DIABETIC RATS

Background. Erythrocyte metabolism is oxygen-independent and is enhanced under hyperglycaemic conditions due to increased glucose uptake. Cornelian cherry (*Cornus mas* L.) is a promising plant with diverse biological activities. This study aimed to investigate the effect of fruit extracts from different *C. mas* cultivars on the level of pyruvate (P), L-lactate (L), their ratio (L/P) and the activity of lactate dehydrogenase (LDH) in the erythrocytes of diabetic rats. **Methods.** Diabetes mellitus (DM) was induced in rats by streptozotocin injection (55 mg/kg b.w.). Rats were divided into five groups ($n = 8$ in each group): 1) control rats; 2) rats with DM; 3) rats with DM treated with extract from fruits of the 'Podolski' cultivar of *C. mas*; 4) rats with DM treated with extract from fruits of the 'Yantarnyi' & 'Flava' cultivars of *C. mas*; 5) rats with DM treated with loganic acid – the main iridoid glycoside, extracted from fruits of *C. mas* 'Yantarnyi' & 'Flava'. Extracts were administered per os once daily (20 mg/kg b.w.) for 14 days. The concentration of pyruvate and the activity of the LDH were determined according to the protocol of the analytical kits "Filicit-Diagnostics" (Dnipro, Ukraine) REF No. HP004.06 and REF No. HP015.01, respectively. The concentration of lactate was determined by an enzymatic-chemical method with the formation of Prussian blue. Statistical significance was assessed using one-way ANOVA and Dunnett's post-hoc test ($P < 0.05$). **Results.** In erythrocytes of diabetic rats, the concentrations of pyruvate and lactate, the L/P ratio, and LDH activity increased by 1.3-, 2.9-, 2.3-, and 2.2-fold, respectively, compared with the control group. Treatment of diabetic rats with the extract from fruits of the 'Podolski' cultivar reduced pyruvate level by 15%, lactate concentration by 2.8-fold, the L/P ratio by 2.4-fold, and LDH activity by 2.1-fold compared with untreated diabetic rats. Administration of the fruit extract of the 'Yantarnyi' & 'Flava' cultivars to rats with DM decreased pyruvate concentration by 10%, lactate concentration by 2.3-fold, the L/P ratio by 2.0-fold, and LDH activity by 2.4-fold. Administration of loganic acid reduced pyruvate level by 20%, lactate concentration by 2.9-fold, the L/P ratio by 2.3-fold, and LDH activity by 3.4-fold, compared with untreated diabetic rats. **Conclusions.** Fruit extracts of *C. mas* improved glucose catabolism in erythrocytes of diabetic rats by normalizing pyruvate and lactate metabolism and reducing LDH activity, thereby alleviating diabetes-induced disturbances in carbohydrate energy metabolism.

Keywords: diabetes mellitus, erythrocytes, pyruvate, L-lactate, lactate dehydrogenase, *Cornus mas* L., fruit extracts, loganic acid.

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