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Biomarkers of oxidative stress in experimental model of diabetes under administration of fruit extracts from different cultivars of *Cornus mas* and hybrid *Cornus mas* × *Cornus officinalis*

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Background. Fruits and vegetables are sources of phytonutrients that have a beneficial effect on human health. A diet high in fruit and vegetables can help to protect an organism against diabetes mellitus (DM), heart disease, cancer and others. In particular, cornelian cherry fruits contain a diverse range of biologically active substances, and medicines based on them are promising for correction of disorders at various pathologies. Therefore, the aim of the study was to investigate the effect of extracts from the “Uholok” and “Koralovyj” cultivars of *C. mas* and the hybrid *C. mas* × *C. officinalis* fruits on plasma biomarkers of oxidative stress in diabetic rats. **Methods.** Diabetes was induced by a single intraperitoneal injection of rats with streptozotocin (STZ) (55 mg/kg b.w.). Animals were divided into five groups containing eight animals each: control rats (healthy rats); rats with STZ-induced DM; diabetic rats treated with extracts. Once daily for 14 days, rats received the following substances by gavage: control and DM groups — 1 mL/rat of water, three groups of diabetic rats — 1 mL/rat of aqueous solutions of fruit extract from the “Uholok”, “Koralovyj” cultivars and the hybrid at a dose of 20 mg/kg b.w., respectively. The evaluation of oxidative stress in blood plasma was performed by measuring the content of products of lipid peroxidation and protein oxidation, as well as reduced glutathione. Analysis of variance followed by Dunnett’s post hoc multiple comparison test was used for data analysis. Differences between the groups were considered

statistically significant at $P < 0.05$. **Results.** The plasma level of TBARS, OMPs and AOPPs significantly increased in the diabetic group by 1.7-, 1.6-, and 1.9-fold, respectively, compared to the control rats. The content of GSH decrease by 1.3-fold in blood plasma under diabetic conditions. The administration of extracts from the “Uholok” and “Koralovyj” cultivars of cornelian cherry and the hybrid *C. mas* × *C. officinalis* to animals with DM significantly lowered the levels of all studied key biochemical markers of oxidative stress (the level of TBARS by 1.7-, 1.7- and 1.9-fold, respectively; the content of OMPs by 1.6-, 2.3- and 2.0-fold, respectively; and the level of AOPPs by 3.6-, 2.3- and 2.4-fold, respectively) compared to the nontreated diabetic group. Such results may be due to the ability of the active components of extracts to bind and neutralize reactive oxygen species. The plasma GSH concentration was increased in diabetic group treated with the fruit extracts from the “Uholok” and “Koralovyj” cultivars of *C. mas* and hybrid by 1.2-, 1.4- and 1.4-fold, respectively. **Conclusions.** The extracts from the “Uholok” and “Koralovyj” cultivars of *C. mas* and the hybrid *C. mas* × *C. officinalis* fruits show strong antioxidant activity by preventing free radical oxidation of plasma biomacromolecules under DM. These extracts have the potential to be developed into antidiabetic drugs.

Keywords: diabetes mellitus, *Cornus mas* L., biologically active compounds, biomarkers of oxidative stress.