COMPARATIVE STUDY OF BEARBERRY POLYPHENOL CONCENTRATES EFFECTS ON ANTIOXIDANT STATUS UNDER EXPERIMENTAL INSULIN RESISTANCE IN RATS

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Date. Insulin resistance (IR) is defined as an altered metabolic response of insulin-sensitive tissues to insulin, and is primarily underlining factor that caused diabetes mellitus type 2 (DM2) [3]. Oxidative stress, which is a common mechanism of IR, leads to imbalance between the reactive oxygen species (ROS) production and antioxidant defense system (AOS) [2]. In this regard, intake of plant polyphenols that possess antioxidant properties could reduce risk of metabolic syndrome (MS) and DM2 development [4].

The purpose and objectives. The aim of this experiment was to carry outantioxidant activity comparative study of differently obtained polyphenol concentrates (PCs) from the bearberry (Arctostaphylosuva-ursi) leafs under the experimental IR in rats.

Materials and methods. Male Wistar rats were randomized into five groups: the intact control group (IC); the pathology control group – animals, who every day intraperitoneally were injected by dexamethasone in dose 15 mg/kg during 5 weeks (IR) [1]; the third (PC1), fourth (PC2) and fifth (PC3) groups – animals with IR (see group 2) that beginning from the 3-th week of experiment were respectively intragastricallyadministered PCs in dose 10 mg of polyphenols/kg during 2 weeks. In liver homogenates were determined diene conjugates (DC), lipid peroxides (LP), reduced glutathione (GSH) content and glutathione reductase (GR) activity using conventional methods. IR development was proved by calculating HOMA indices. Nonparametric Mann-Whitney criterion was used to perform statistical analysis (Statistica 6, USA).Difference was considered statistically significant if P□0.05.

Results and Discussion. IR development led to significant LP increase (123.56□5.67 nmol/g tissue) and DC (4.58□0.31 nmol/mg lipids) compared with IC group (58.37□1.23 and 0.98□0.01 nmol/mg lipids, respectively). At the same time IR suppressed the liver antioxidant system. It was found that in IR animals GSH content decreased (1.99□0.18 vs IC 4.98□0.13 mkmol/g tissue) and GR activity was reduced (8.63□0.98 vs 19.34□1.15 nmolNADPH/min/mg protein). PCs administration significantly lower the LP and DC content in liver compared with IR animals and the most active was PC3 (LP: 98.23□1,23 nmol/g tissue; DC: 2.36□0.15 nmol/mg lipids). However the GSH content growth and GR activity increased compared with IR animals. These indices proved the potent antioxidant activity of PC3 by improving AOS in liver (GSH: 1.99□0.18 mkmol/g tissue; GR: 8.63□0.32 nmolNADPH/min/mg of protein). This effect of PCs, which are rich with such arbutin and gallic acid, is mediated by the phenolic compounds ability to interact with ROS as well as with peroxide radicals and also to inhibit activity of enzymes that generate ROS.

Conclusions. The revealed protective action suggested the possibility to use PCs in complex therapy of IR.

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