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THE TRIGONELLA FOENUM GRAECUM EFFECT ON THE ERYTHRON SYSTEM IN ALLOXAN-INDUCED DIABETES RATS

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Relevance. Nowadays, wide variety of antidiabetic drugs cannot prevent the early and complications development of diabetes mellitus (DM). The primary target of high glucose concentration in this pathology is the erythron system, which undergoes irreversible modifications at the molecular and cellular levels. An alternative solution of this problem is offered by phytotherapy through using herbal medicines, with is commercially available and is characterized by low side effects. Fenugreek (F.) – *Trigonella foenum-graecum* (*Fabaceae* family) is known by hypoglycemic and antioxidant properties. However, data about the mechanisms of fenugreek extract influence on the erythron system in diabetes are insufficient.

Goal: to explore the effect of water-ethanol extract of *Trigonella foenum graecum* on the state of the erythron system in rats with alloxan-induced diabetes mellitus.

Materials and methods. A total number $N = 55$ of mature *Vistar line* male rats (weight – 140-230 g) were selected for the experiment. They were divided into 3 groups: I – intact control ($n=6$), II - the treatment group ($n = 24$), were treated by 5% of water-ethanol F. extract for 28 days, III – alloxan-induced diabetes rats ($n = 25$), which receives 5% F. extract solution. Blood sample was collected by decapitation under thiopental narcosis. To assess the state of lipid peroxidation used a test with thiobarbituric acid (modification of the E.N. Korobeynikova method). The activity of superoxide dismutase (SOD) was determined by changing the reduction processes of nitrosine tetrazolium in the presence of NADH and phenazine metasulfate. Catalase activity (CAT) - by titration reaction with potassium permanganate. The concentration of total hemoglobin (Hb) was determined by hemoglobinocyanide method by using a set of reagents "Genesis", Ukraine; concentration of glycosylated hemoglobin (HbA1c) - "Felicity diagnostics", Ukraine; level of methemoglobin (metHb) - "Reagent", Ukraine. The iron content in the blood of rats was determined by atomic absorption spectroscopy by using a spectrophotometer C-115 PC. The number of erythrocytes was counted in Goryaev's chamber. For statistical processing, we used the Microsoft Office Excel 2013 software package with Student's criterion. The $p \leq 0.05$ and $p \leq 0.01$ correlations were considered as statistically significant, $p \leq 0.1$ and $p \leq 0.2$ - as tendencies to the correlation.

Results and discussion. Systematic application of F. extract is resulted by reduction of blood glucose concentration on 14 and 28 days (49 and 35%, respectively) in diabetes rats, in comparison with 7 days. Hematological parameters of the rat's with alloxan diabetes mellitus and fenugreek extract correction were changed. Amount of RBC decreased on 28 day into 15%, MCH – 11.7%, Hb – 29%, compared to control group. Nevertheless, in the same time the concentration of HbA1c in rat's erythrocytes decreased significantly ($p < 0.01$). In animals with diabetes + F. extract, on 21 day the HbA1c index was lowered - into 3 times than on 14 day. However, an increase of methHb levels of 1.4 times and 1.67 times was observed in groups II and III, respectively, compared to the intact group. The level of iron in the blood of III group rats on the 7th day exceeded the control level with subsequent normalization of this value. The state of the pro- and antioxidant system was characterized by an increase of the POL products level in rats of group III into 1.6 times (day 14) and 1.14 times on the 21st day of the experiment, compared with the value of group II. KAT activity increased into 40% (day 14), but on 21 day it decreased to a minimum (1.4 times), compared to control. SOD activity was lower than the control value by 39% (7 days), but on 21 day it increase to 32%.

Conclusions. Experimental dates confirm the hypoglycemic properties of 5% aqueous-ethanolic extract of F. and shows normalizing effect on red blood cells functioning in alloxan-induced diabetes rats. The obtained results encourage further research into the action of this plant and the prospects of its use in medicine and pharmacy.