THE EFFECT OF THE MIXTURES WITH BIOLOGICALLY ACTIVE SUBSTANCES FROM FRAXINUS EXCELSIOR AND PHLOMIS PUNGENS ON THE RESISTANCE TO HYPOXIA IN WHITE RATS COMPARED TO THE ACTION OF α-TOCOPHEROL AND MEXIDOL

Bogachik Ju. R.
Scientific supervisors: Ph.D. Akhmedov E.Yu.
National Pharmaceutical university. Kharkiv. Ukraine
Super.dan.96@ukr.net

Introduction. Any pathological process in the body is more aggressive in the presence of hypoxia, or hypoxias themselves play a role in the pathogenesis of diseases. Ischemic diseases of the heart and brain, impaired supply of oxygen to the body organs, and even some infectious diseases occur as a result of hypoxia. Therefore, protection of the body from hypoxia and its undesirable effects is an urgent problem of practical medicine and is of great social importance.

Taking all of this into account the **aim** of our research was to study the antihypoxic action of the biologically active mixtures obtained from Fraxinus excelsior (European ash) and Phlomis pungens (Jerusalem sage) and compare their action with α-tocopherol and mexidol.

Materials and Methods. When conducting our study the methods of acute hypobaric hypoxia were used. The model of acute hypobaric hypoxia was created using white rats in an airless pressure chamber. The pressure was measured by an altimeter, the rate of hoisting – by a variometer. The animals were hoisted at an altitude of 11.000 m and at the rate of 25 m/s (198.7-185 mmHg). This position was held for 10 min. Then the animals were returned to their previous position for 5 min. To eliminate hypercapnia the CO_2 absorber (30-35% alkali) was placed to the chamber. To create the same conditions of hypoxia simultaneously 3 animals of each group (experimental and control) were placed to the chamber. There was the own control group for each experimental group. The life span of animals and the number of surviving rats were calculated. To compare the antihypoxic resistance of biologically active mixtures obtained from Fraxinus excelsior and Phlomis pungens with α-tocopherol and mexidol these substances were injected into the abdominal cavity of the animals 40 min before the experiments. The control group of animals was injected the same amount of physiological salt solution. The data obtained during the experiments were statistically processed in accordance with the current re- quirements.

Results and Discussion. The resistance of biologically active mixtures obtained from Fraxinus excelsior and Phlomis pungens to hypoxia was studied compared to α-tocopherol and mexidol in male and female white rats on the background of hypobaric hypoxia. The similar experiments were also conducted on intact white rats. The rats

were injected abdominally with the biologically active mixture from Fraxinus excelsior in the dose of 300 mg/kg, the biologically active mixture from Phlomis pungens in the dose of 400 mg/kg and α-tocopherol and mexidol in the effective doses of 200 mg/kg.

The biologically active mixtures obtained from both plants showed the antihypoxic action in female and male white rats. Thus, the biologically active mixture from Fraxinus excelsior in the dose of 300 mg/kg injected abdominally increased the resistance to hypoxia in both male and female rats. The results of the control group of male rats were 9.19±0.31 min, with introduction of the biologically active mixture from Fraxinus excelsior (300 mg/kg) the results increased to 12.20±0.04 min. Therefore, when using the biologically active mixture from Fraxinus excelsior in male rats the resistance to hypoxia statistically increased by 32.8%. The antihypoxic effect of the biologically active mixture from Fraxinus excelsior was also observed in female rats. The results of the control group were 8.59±0.16 min, while on the back-ground of the biologically active mixture from Fraxinus excelsior (300 mg/kg) they were 11.23±0.05.

The results obtained have shown that the biologically active mixture of Fraxinus excelsior in the dose of 300 mg/kg increases the resistance of male rats by 32.8%, and female rats by 30.7% to hypoxia.

The similar powerful antihypoxic effect was observed with abdominal introduction of the biologically ac- tive mixture of Phlomis pungens in the dose of 400 mg/kg. he results of the control group were 9.19±0.31 min in male rats, while when using the biologically active mix- ture from Phlomis pungens (400 mg/kg) they were 10.64±0.33 min. This means that the biologically active mix- ture from Phlomis pungens in the dose of 400 mg/kg statistically increased the resistance to hypoxia by 15.8% ($p<0.01$) in male white rats. When introducing the biolo- gically active mixture from Phlomis pungens in the dose of 400 mg/kg to female rats the results were 9.30±0.03 min, and the values of the control group were 8.59±0.16 min. Thus, the resistance to hypoxia of female white rats re- ceiving the mixture from Phlomis pungens (400 mg/kg) statistically increased by 8.3%.

To check the efficiency of the results obtained the mixtures studied were compared to the action of the natural antioxidant α-tocopherol and the synthetic antioxi- dant mexidol. The research demonstrated that the abdomi- nal injection of α-tocopherol in the dose of 200 mg/kg increased the resistance to hypoxia in the group of white male rats compared to the control. The results of the control group were 9.19±0.31 min, while the introduction of α-tocopherol (200 mg/kg) increased the results to 10.40±0.33 min. Thus, α-tocopherol statistically in- creased the resistance to hypoxia of male white rats by 13.2%. The antihypoxic effect was also observed in ex- periments with female rats. The results in the control group of female rats were 8.59±0.16 min, while when in- troducing α-tocopherol they increased to 9.30±0.03 min.