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THE EFFECT OF SPOTTED HEMLOCK ON THE GLUTATHIONE SYSTEM IN CONDITIONS OF EXPERIMENTAL TUMOR GROWTH

In literature sources related to folk medicine and medicinal plants, a lot of data is dedicated to plants' obtained alkaloids. Among them, Spotted hemlock (*Conium Maculatum* L.), which contains the alkaloid coniine, has been known since ancient times, which is sometimes confused with the plant *Cicuta Virosa*, known to the ancient Greeks, which also belongs to the parsley family (*Umbelliferae*).

The German homeopathic handbook [1] gives the implementations of spotted hemlock, namely the use of coniine alkaloid treating depression, diseases of the central nervous system, disorders of peripheral motor and sensory nerves, cachexia, endocrine gland tumors, prostate adenoma, inflammation of lymph nodes and vessels, breast.

The sphere of our interests included the processes of free radical oxidation of lipids – a natural metabolic process that takes place in the body and under physiological conditions is regulated by a multicomponent antioxidant system, which ensures the preservation of the concentration

of products of free radical oxidation of lipids in tissues at a constant level, and under the conditions of the development of malignant neoplasms [2], this balance changes in the direction of activation of oxidant processes and inhibition of antioxidant protection. Tincture of spotted hemlock was used in the work being made according to a new technology from a mixture (flowers, leaves and seeds) in a ratio (1:10) with 70% ethyl alcohol. It was prepared by the method of maceration (infusion) in ethyl alcohol, taking into account the recipe for making tinctures from potent and poisonous plants as described in the pharmacopoeia. Currently, there are no officially registered medicinal products based on spotted hemlock in Ukraine, including tinctures.

The conducted scientific studies have shown that free radicals can participate in the processes of carcinogenesis [3]. There are a number of ways of interaction between oxidative stress and tumor promotion [4]. Prooxidant substances can stimulate the activity of phospholipases, protein kinases, increase the level of intracellular calcium and diacylglycerol, affect signal transduction at the level of receptors and proteins, lead to the expression of proto-oncogenes [5].

Studying the effect of biologically active substances of spotted hemlock (flavonoids, carotenoids, tannins, ascorbic acid, etc.) on the state of the oxidant and antioxidant blood system of rats in the experiment, carried out under the conditions of tumor growth, was our research aim.

We've chosen Walker's carcinosarcoma as a model of experimental tumor growth, which was transplanted in accordance with accepted methods [6].

The conducted studies of the state of the oxidant and antioxidant system of the blood of rats with Walker's carcinosarcoma showed, that on the seventh day after tumor transplantation, the accumulation of all products of lipid peroxidation (PLP) in the blood of animals was observed. The induction of free radical oxidation processes caused by the influence of a malignant tumor leads to significant disturbances in the functioning of the blood antioxidant protection systems. In whole blood, the content of reduced glutathione (RG) decreased by 44.9%, the activity of antioxidant enzymes also decreased – glutathione peroxidase – by 24.5%, catalase – by 13.3%, superoxide dismutase – by 14.8%. Under these conditions, the activity of glutathione reductase increased by 19.9%, glutathione transferase – by 24.7%, and the ceruloplasmin content – by 25.5% in comparison with control (intact animals).

In further observations (on the 14th day), we've noted a reduced activity of all other enzymes of antioxidant protection. Thus, catalase activity decreased by 26.6%, superoxide dismutase activity decreased by 26.4%. A tumor in the process of development releases a large number of various

toxins and the organism responds by increasing the activity of glutathionetransferase (GT) in blood serum by 36.4% and ceruloplasmin by 47.9%. The content of RG in the blood decreased by 58.2%, what may be associated with its active use by glutathionetransferase, and as compensation – an increase in glutathionereductase activity by 48.5% compared to the control.

We conducted a study of the influence of *Conium Maculatum* L. tincture on the state of lipid peroxidation and on the antioxidant system of rat blood. A wide range of doses was chosen, corresponding to 1/5, 1/3 and 1/2 LD₅₀). Intra-gastrical administration of the tincture was carried out three, seven and fourteen times with an interval of 24 hours.

According to preliminary calculations, the average effective dose of tincture of spotted hemlock is 2.0 ml/kg, which is 1/3 of the LD₅₀.

Administration of the spotted hemlock tincture fourteen times caused normalization of lipid peroxidation and antioxidant protection processes in the blood. Comparing the obtained data with blood indicators of rats with Walker's carcinosarcoma, we've noted a decrease in all studied indicators of PLP – ceruloplasmin content and GT activity by 30.8% and 22.8%, respectively. At the same time, activation of the glutathione system and enzymatic reactions of other studied antioxidant enzymes was noted, and also activation of glutathione regeneration enzymes (from 25.0% to 76.0%) comparing to the control.

In parallel with the conducted studies of the effect of the spotted hemlock tincture on the state of the oxidant and antioxidant system of the blood of rats with Walker's carcinosarcoma, the antitumor activity was also studied in accordance with the accepted approaches. The antitumor effect of the Spotted hemlock tincture was evaluated by the percentage of inhibition of tumor growth by weight and the change in the life span of animals, using due formulas [6].

Bibliography:

1. Homoeopathic Repetitorium: Materia Medica in Tabular Form / Willmar (Firm) Schwabe & Company. Karlsruhe, 1994. 165 s.

2. Ray G., Husain S.A. Oxidants, antioxidants and carcinogenesis *Indian J. Exp Biol.* 2002. Vol.40, №. 11. P. 1213–32.

3. Ríos-Arrabal S., Artacho-Cordón F., León J. et al. Involvement of free radicals in breast cancer. *Springerplus.* 2013. Vol. 27, № 2. P. 404. doi: 10.1186/2193-1801-2-404.

4. Reuter S., Gupta S.C., Chaturvedi M.M., Aggarwal B.B. Oxidative stress, inflammation, and cancer: how are they linked? *Free Radic Biol Med.* 2010 Vol. 1, № 49(11). P. 1603–16. doi: 10.1016/j.freeradbiomed.2010.09.006

5. Kontomanolis E.N., Koutras A., Syllaios A. et al. Role of Oncogenes and Tumor-suppressor Genes in Carcinogenesis. *A Review. Anticancer Res.* 2020. Vol. 40, № 11. P. 6009–6015. doi: 10.21873/anticancerres.14622

6. Доклінічні дослідження лікарських засобів: методичні рекомендації / за ред. О. В. Стефановою Київ : «Авіцена», 2001. 527 с.

DOI <https://doi.org/10.36059/978-966-397-303-6-74>

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THE FIRST STEP OF THE ALTERNATIVE APPROACH IN WELLNESS PRACTICES IN CONDITIONS OF TRANSITION TO REMOTE MODE

At the present time, the relevance of Health remains very high. Health is inextricably linked with the person himself throughout life. Remote activity on some sides negatively affects Health. A person communicates less live with other people. At the same time, the general time is spent in frozen poses: sitting at the table, half -head in bed, lying in bed.

It turns out that a person wins the time that he had previously spent on the road to and from work, and simultaneously loses movement, physical efforts spent on walking. For example, standing in a crowded minibus, bus, trolley, tram activates the work of some muscles, especially given the abrupt type of vehicle movement. Preservation of equilibrium requires muscle work.

Being to work, a person is in contact with the environment, in particular, microorganisms of other people. This launches the work of the immune system, and with a healthy lifestyle, regular minimal training can be healthy. On the other hand, if the human body is weak, then personal contact can be the cause of the disease, especially in the spring-autumn periods.

When a person is at home most of the time, many systems are atrophy, the immune system ceases to work properly. The lack of contact with other people's microorganisms does not affect the body well, not to mention the amorphousness of a motionless lifestyle. Sometimes it comes to the point that a person does not even leave the house, but orders food to the house.