BIOTOXICANTS AND THEIR IMPACT ON LIVING ORGANISMS

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Abstract: *the impact of biotoxines on living organisms is discussed in the article; the results of the study of the inhibiting effect of Dibornol on the processes of lipid peroxidation are given. At present the humanity knows about 10 million of chemical compounds. And most of them under certain circumstances can cause "serious injury". This circumstance casts doubt the possibility to distinguish from the totality of the chemical substances of the world, natural and synthetic by a man, a certain group, referred to as "poison".*
Keywords: *biotoxicity, inhibitors, poison, Dibornol, lipid peroxidation.*

БИОТОКСИКАНТЫ И ИХ ВЛИЯНИЕ НА ЖИВЫЕ ОРГАНИЗМЫ

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Аннотация: *в статье рассматривается влияние биотоксикантов на живые организмы; приведены результаты исследования ингибирующего действия Диборнола на процессы пероксидного окисления липидов. В настоящее время человечеству известно около 10 миллионов химических соединений. И большая их часть при определенных обстоятельствах может причинить серьезный вред здоровью. Подобное обстоятельство ставит под сомнение саму возможность выделить из всей совокупности химических веществ окружающего мира, естественных и синтезированных человеком, некую группу, обозначаемую как «яд».*
Ключевые слова: *биотоксиканты, ингибиторы, яд, Диборнол, пероксидное окисление липидов.*

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At present there are about 10 million of chemical compounds. More than 60 thousand of them are widely used in everyday life, medicine, in manufacturing and agriculture. This number of substances continues to increase from year to year (according to some sources approximately 1,000 items annually). And most of them under certain circumstances can cause "serious injury" [5].

This circumstance calls in question the very possibility to allocate out of the aggregate of chemical substances of the surrounding world, natural and synthesized by man, some group, referred to as "poison". The accumulated knowledge of the humanity led to the awareness of the fact that virtually any chemical substance, depending on quantity, can be indifferent, useful, harmful to the body (i.e. act as a poison).

Toxicity is the property (ability) of chemicals to cause their damage or death, influencing the biological systems non-mechanically, or with respect to the human body, - the ability to cause malfunction, disease or death. Currently, toxicants are now understood as substances that are distributed in our environment far beyond their original location, and therefore have a more or less hidden harmful effects on animals or plants, and in some cases on a person.

Protection of nature from the coming chemical hazards has become a global problem. This problem is particularly relevant to the Astrakhan region, where industrial production is devastating to nature. The specificity of environmental pollution of the city is directly connected not only with industry but also with physical-geographical characteristics of the location of the city [6].

Extraction and processing of oil and gas that are the main sources of income of the Astrakhan region, have detrimental impact on the environment, causing irreversible damage not only to nature but also leads to deadly diseases. The extraction and use of heavy oil is expected to exacerbate the problem of carbon dioxide and greenhouse gas emissions throughout the world [1, c. 98].

In considering this topic, a study was conducted of the antioxidant activity of Dibornol in the processes of lipid peroxidation in terms of autookislenia and in the promotion process by compounds of heavy metals.

Lipid peroxidation (LPO) of cell membranes makes the main contribution to the self-radical processes in living organisms. This process is natural for life of the cells. However, a significant increase of the lipid peroxidation level is accompanied by the destruction of cell membranes and causes a number of pathological conditions. In addition, the process of peroxidation is enhanced by secondary reactions – the formation of highly reactive and readily diffusible peroxyl radicals from lipids and their decomposition products- carbonyl compounds, which cause the development of pathological processes in various organs.

It is known that in the body the role of antioxidant protection is performed by non-enzymatic low-molecular compounds (α-tocopherol, ascorbic acid, glutathione) and enzymes (catalase, peroxidase, superoxide dismutase). In pathological disorders the multilevel system of antiradical protection of an organism is not able to maintain an optimal level of radicals, therefore it is necessary to use therapies based on antioxidants to reduce oxidative stress and protect cells from the damaging effects of free radicals. Depending on different conditions one and the same compound the potential antioxidant can manifest as anti - and Pro-oxidant effect, so it is important to conduct a comprehensive study of antioxidant activity of compounds in different model systems. This approach allows us to estimate the reactivity of the substance and to determine the nature of its antioxidant action. Today the highly effective inhibitors of free-radical processes are spatial-obstructed phenols. The creation of "hybrid molecules" possessing multiple mechanism of antioxidant action due to the presence of different functional groups greatly increases the probability of neutralization of the active particles involved in the processes of development of oxidative stress in living organisms. As a biological object of research Russian sturgeon was chosen due to its significant economic value. In addition, in recent decades, the population of these valuable species in nature has been steadily declining as a result of fishing, and because of the increasing influence of anthropogenic load contributing to the development of oxidative stress in fish. All this dictates the necessity to search new types of protectors against oxidative stress. As model systems in the study of LPO in conditions of prolonged oxidative stress the homogenate of the liver of sturgeon was selected. The homogenate of the liver is a classic model to study LPO, as in the cells of this body the proteins of protective systems are concentrated, they prevent from toxicity of endo-and exogenous agents. The obtained results in the model system LPO of homogenate of liver at all tested stages of oxidation show a marked antioxidant effect of Dibornol.

Analysis

- Homogenized the liver of sturgeon.
- Took a sample of liver homogenate in the amount of 1 gr. mixed with 19.5 ml of cooled to 0-4°C solution of potassium chloride.
- In test tubes 2.0 ml of the resulting mixture and 0.1 ml solutions of ascorbic acid and salts Mora were poured, 1 ml of a solution of trichloroacetic acid was added.
- The tubes were placed for 10 minutes in a water bath at 37°C.
- Centrifuged 10 min at 3000 rpm.
- 2 ml of the supernatant were collected in clean test tubes.
- 1 ml of the solution of thiobarbituric acid was added to each tube.
- The samples were placed in a boiling water bath for 10 minutes and then were cooled to room temperature.
- After cooling 1.0 ml of chloroform was added to the sample to obtain a clear solution and it was centrifuged for 15 minutes at 3000 rpm.
- The supernatant (6 samples for each experiment) was selected and extinction of the sample was measured at the spectrophotometer SF-103 at 532 nm relative to the control sample.

Thus during the studies, it was revealed that Dibornol inhibits Pol processes thereby reducing the toxic effect of Bu2SnCl2 and CH3HgJ.

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