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ECOLOGICAL ASPECTS OF MIXED EFFECT OF CHEMICAL AND PHYSICAL FACTORS

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Introduction. Increased man-caused loads on the biosphere are a feature of the current ecological situation. From the viewpoint of the scale of negative consequences on the environment, the most unfavorable is a simultaneous action of chemical and physical factors. Chemicals migrate from one environment to another and over long distances; they are transformed in the environment with formation of more toxic and dangerous compounds and their subsequent ingestion. Electromagnetic radiation has acquired the significance of a global physical factor of environmental pollution with an aggressive impact on biological objects. The above factors can affect ecosystems in combination with the temperature factor, in particular with positive low temperatures. The purpose of these experimental studies consisted in revealing peculiar responses of the warm-blooded organism to the adverse influence of isolated and mixed effects of chemical and physical factors in conditions of cold stress.

Materials and methods. The studies were carried out on mature white male rats in conditions of a subacute laboratory experiment (1 month). The animals were exposed to electromagnetic radiation (frequency 70 kHz at a voltage of 600 V/m) and a chemical on the example of a cutting emulsion of "Typol" or "Trim" brands (5,000 mg/kg) under conditions of cold stress ($4 \pm 2^\circ\text{C}$).

Results of research. The results of the experiments demonstrate a more pronounced mixed effect of physical and chemical factors on the organism in conditions of cold stress versus their isolated effect. An increase of adverse effects was detected by the criterion of haematological changes and morphological changes in the internal organs. It can be considered that the mechanism of enhanced harmful effects lies in the reactions that arise in the body, particularly in cold stress, lead to a change in the general reactivity of the organism and result in its increased sensitivity to the effects of a complex of factors.

Conclusions. An enhancement of negative effects of physical and chemical factors in their mixed action necessitates consideration of these effects when working out methods for determination and regulation of anthropogenic loads on ecosystems and subsequent prediction of the state of biological objects under the influence of environmental factors.